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PARTIAL AUTOMATION OF LANDING FORCE EMBARKATION PLANNING

K. R. BLAND
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PARTIAL AUTOMATION OF LANDING FORCE EMBARKATION PLANNING

by

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Lieutenant Colonel, United States Marine Corps

and

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Lieutenant Commander, United States Navy

Submitted in partial fulfillment of
the requirements for the degree of

MASTER OF SCIENCE
IN
MANAGEMENT/DATA PROCESSING

United States Naval Postgraduate School
Monterey, California

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ABSTRACT

This thesis describes EMBARK, a system of computer programs developed to automate one of the phases of embarkation planning. These programs are designed to accumulate the information and produce the loading forms required to prepare the loading plan for a Marine Corps amphibious landing.

The system will print the following documents: Unit Cargo Manifest, Cargo and Loading Analysis Form, Vehicle Summary and Priority Table, and Unit Personnel and Tonnage Table.

In the past, these forms were prepared manually from information accumulated manually: a slow, laborious process. Today, the time element in warfare has become critical. Amphibious operations which formerly could be planned and executed over a period of months must now be accomplished in weeks. In order to reduce the planning and execution times, it is necessary to mechanize the preparation of the loading forms. The EMBARK system was developed to accumulate the necessary information, process it, and produce the loading forms. The methods of the system are described and illustrated. Finally, the use of computers to solve other amphibious planning problems is considered.

TABLE OF CONTENTS

SECTION	TITLE	PAGE
I	Introduction	1
II	Sequence of Planning	9
III	The EMBARK System	14
IV	Program EMBARKD	18
	1. Subroutine UCM	19
	2. Subroutine VSP	21
	3. Subroutine UPT	23
	4. Subroutine CANDLA	24
V	Program MOUNTOUT	50
VI	Program TABLE	59
VII	Future Developments	71
VIII	Appendix A	74
IX	Appendix B	81
	1. General Operating Instructions	82
	2. Minor Subroutine Listings	84
X	Bibliography	95

LIST OF ILLUSTRATIONS

Figure		Page
1	EMBARK System Flow Chart	7
2	Loading Plan Diagram	13
3	Schematic of Program EMBARKD	17
4	Program EMBARKD - Flow Chart	27
	A - Fortran Listing	29
5	Subroutine UCM - Flow Chart	31
	A - Fortran Listing	33
	B - Sample Printout	35
6	Subroutine VSP - Flow Chart	36
	A - Fortran Listing	37
	B - Sample Printout	39
7	Subroutine UPT - Flow Chart	40
	A - Fortran Listing	42
	B - Sample Printout	44
8	Subroutine CANDLA-Flow Chart	45
	A - Fortran Listing	47
	B - Sample Printout	49
9	Standard Infantry Regiment	54
10	Program MOUNTOUT- Flow Chart	55
	A - Fortran Listing	57
	B - Sample Printout	58
11	Program TABLE - Flow Chart	62
	A - Fortran Listing	65
	B - Sample Printout	70
12	EMBARKD Worksheet	80

TABLE OF SYMBOLS, ABBREVIATIONS AND SPECIAL TERMS

BCD -- Binary coded data

CUBE -- Number of cubic feet required aboard ship for an item

Floating Dump -- High priority (emergency-type) supplies, usually Class V and medical

Heavy Lift -- Any single cargo lift, exclusive of vehicles, weighing over 10,000 pounds

Loading Forms
  UCM -- The Unit Cargo Manifest
  C&LA -- The Cargo and Loading Analysis Form
  VS&PT -- The Vehicle Summary and Priority Table
  UP&TT -- The Unit and Personnel and Tonnage Table

LPH -- Converted aircraft carriers used by USMC in amphibious operations as assault ships (designated Landing Platform Helicopter)

Material Classes
  Class 1 -- Food and water
  Class II -- Issued equipment
  Class III -- Petroleum, oils and lubricants
  Class IV -- Special equipment
  Class V -- Ammunition

Measurement Tons -- A measurement of the volume required for cargo. One measurement ton equals 40 cubic feet.

Mobile-Loaded Cargo -- Cargo loaded in vehicles

POL -- Petroleum, oils and lubricants

Short Tons -- A measurement of cargo weight obtained by dividing the total number of pounds of cargo by 2000. One short ton equals 2000 pounds.

Standard Cargo -- All cargo not falling into the heavy lift or mobile loaded categories

T/A -- USMC Table of Allowances - The source of allowance information for items authorized the Fleet Marine Force and organized Marine Corps Reserve Units

T/A Number -- A unique number assigned to each item of supplies and equipment

T/E -- USMC Tables of Equipment - items of equipment specifically assigned to each organization

T/E Number -- A unique number assigned to identify a type of organization

T/O -- USMC Tables of Organization - personnel assigned to each organization broken down by rank and major operational specialty

T/O Number -- The same number as the T/E number for the particular organization

Unitized Cargo -- Cargo which has been grouped on a platform (pallet) or in a container in such a way as to form a single unit weighing less than 10,000 pounds

Vehicle -- Any wheeled, track-laying, or combined wheeled and track-laying equipment. In addition, other equipment such as skid-mounted generators which require stowage on an area (square foot) basis

SECTION I

INTRODUCTION

The success of any amphibious operation is dependent in a large measure on complete embarkation planning which involves all those actions necessary to assure timely and effective loading of the amphibious task force [2].

The outstanding characteristic of successful amphibious operations is the rapid and effective manner in which assault troops establish themselves ashore. The power and size of the landing force must be expanded to the maximum in the shortest possible time. This requires a rapid, yet orderly buildup of men and material. The extent to which this can be done depends primarily on the manner in which the ships have been loaded. Also a proper loading increases the inherent flexibility of the amphibious task force and is a key factor in assuring success. It is the purpose of this paper to provide a system using electronic data processing (EDP) techniques for the rapid and accurate preparation of documents required in the embarkation planning and loading phase of an amphibious operation. This system of programs will be called EMBARK.

As an introduction to the EMBARK system, the four cardinal principles of embarkation planning will be outlined.

A. Personnel, equipment and supplies must be loaded in such a manner that they can be unloaded at the time and in the correct sequence required to support operations ashore.

B. Troops should not be separated from their combat equipment and supplies.

C. Unloading must be planned to proceed rapidly in the beach area.

D. Critical units and supplies must be dispersed among several ships.

Some of the other considerations which affect the embarkation plan are:

1. Mission of the force.
2. Limiting dates of the embarkation, movement and assault phases.
3. The organization for the embarkation of the landing force must be compatible with the plan for the ship-to-shore movement which, in turn, must support the scheme of maneuver.
4. Size and characteristics of the troops and naval forces involved. This includes the availability and characteristics of shipping, and quantity and types of material to be embarked.
5. Embarkation areas and points must be selected.
6. Marshalling areas may be required when camp areas are so located that movement to embarkation areas cannot be accomplished without interruption.
7. The feasibility and desirability of using helicopters to embark the embarkation teams assigned to amphibious assault ships.

Effective embarkation planning is dependent on the early receipt of the above information from higher authority. Detailed planning begins with the determination by the Landing Force Commander of the

embarkation team composition, ship assignment and designation of the Embarkation Team Officers.

The loading plan for each ship is prepared by the Team Embarkation Officer under the supervision of the Embarkation Commander. The plans must be prepared promptly and accurately. All the figures shown in the wt (lbs)., cu. ft., and sq. ft. columns on the loading forms are the actual weight, volume and area of the items of cargo as loaded aboard ship.

In this paper, when the term "loading" is used, it refers to "combat loading." Combat loading gives primary consideration to the facility with which troops, equipment and supplies can be unloaded for combat, rather than to the economical use of ship space. Also, in combat loading an attempt is made to load the ships so as to provide as much flexibility as possible to meet changes in plan or other emergencies.

Loading serial numbers are used to identify elements of the landing force which are landed prior to the general unloading. These serial numbers (which are not a statement of priority, but a means of identification) are published in a Serial Assignment Table which forms part of the landing plan. A single serial number is assigned to each unit, including its equipment (except for floating dumps),[1] which for tactical and logistic reasons is to be embarked entirely in one ship; landed as a unit at one beach or helicopter landing zone; and landed at approximately the same time. A unit's serial number will be referred to hereafter as a Serial.

---

[1] The Table of Symbols, Abbreviations and Special Terms provides a consolidated list of all special terms used in the text.

To be effective, each Serial must be loaded in a way that permits its simultaneous unloading [8]. To achieve simultaneous unloading of all elements of a Serial the Embarkation Officer must spread the Serial throughout the various holds of the ship. Serials, therefore, must be composed realistically.

The planners who organize the Serials must be careful to avoid improper assignment. If too many items are assigned to one serial number the means of landing will be held up until the entire serial group is unloaded or the Serial will be unloaded in increments; both are undesirable [5]. In the EMBARK system, Serials will be entered manually on the VS&PT, after its preparation by the computer, using the information in the Serial Assignment Table of the landing plan.

The various documents prepared by the EMBARK system of the programs (shown in detail in Section III) will now be described briefly. Each unit or detachment embarking men, equipment or supplies aboard a ship prepares four loading forms:

1. Unit Cargo Manifest;
2. Cargo and Loading Analysis Form;
3. Vehicle Summary and Priority Table;
4. Unit Personnel and Tonnage Table.

With the exception of the Unit Cargo Manifest, these forms are submitted to the Embarkation Team Commander for incorporation in the loading plan.

A. THE UNIT CARGO MANIFEST (UCM) is the basic form for gathering accurate data on all cargo other than vehicles. It is the basis for preparing the Cargo and Loading Analysis form. It also provides a record of loading data on each container, pallet and piece of equipment (less vehicles).

B. THE CARGO AND LOADING ANALYSIS FORM (C&LA) provides a detailed breakdown of the cargo (less vehicles) by type, weight and volume. It shows which cargo is stowed as standard cargo, which is unitized, any heavy lifts, and which cargo is loaded in vehicles. The number of square feet involved is given for unitized cargo and heavy lifts.

C. THE VEHICLE SUMMARY AND PRIORITY TABLE (VS&PT) lists all vehicles by priority for unloading, including the dimensions and weight for each vehicle. Included in this form are the volume and weight of mobile-loaded cargo, i.e., cargo loaded in vehicles.

D. THE UNIT PERSONNEL AND TONNAGE TABLE (UP&TT) is a recapitulation of the information shown in the Cargo Loading Analysis, the Vehicle Summary and Priority Table, plus a breakdown by the number and rank of personnel to be embarked. The UP&TT is subdivided to reflect the following categories of embarkation data: (1) personnel, (2) Class I, (3) authorized allowances (Classes II and IV), (4) Replenishment (Classes II and IV), (5) petroleum, oil, and lubricants (POL - Class III), (6) ammunition (Class V)[14], (7) other supplies and (8) vehicles.

Aviation supplies and equipment are listed separately under the various category headings with a detailed breakdown being given on the reverse side of the UP&TT in the form of a SUPPLEMENTAL UP&TT FOR AVIATION MATERIALS.

Using as a basis these forms prepared by the Unit Embarkation Officers, consolidated tables of the foregoing are made up for all units embarked in a single ship. The detailed stowage and loading plan is then prepared from these tables and lists.

The following diagrams (Figure 1) indicate the methods used by the EMBARK system to prepare the necessary tables and lists required in embarkation planning.

EMBARK SYSTEM

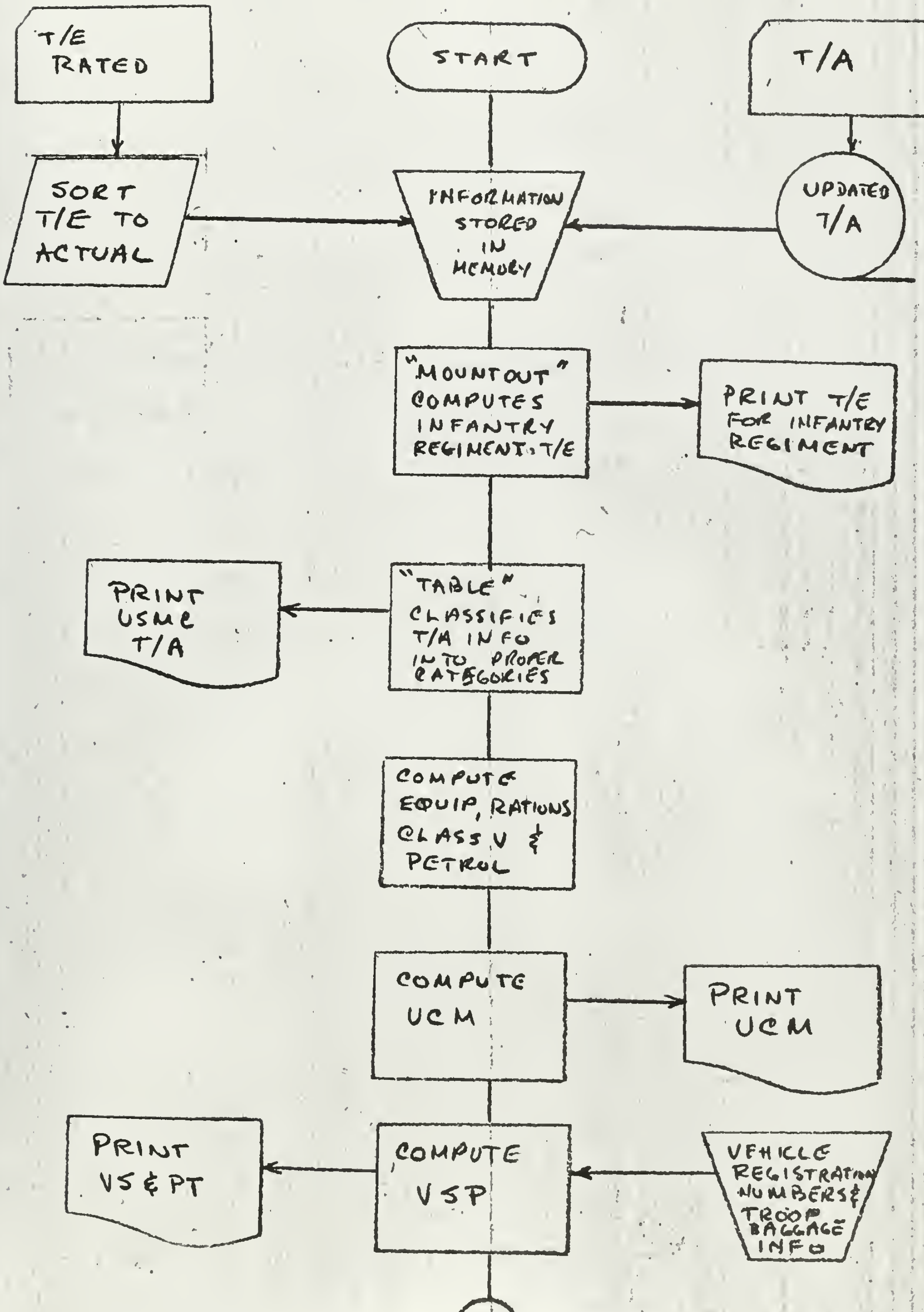

T/E RATED
SORT T/E TO ACTUAL
START
INFORMATION STORED IN MEMORY
T/A
UPDATED T/A
"MOUNTOUT" COMPUTES INFANTRY REGIMENT: T/E
PRINT T/E FOR INFANTRY REGIMENT
PRINT USMC T/A
"TABLE" CLASSIFIES T/A INFO INTO PROPER CATEGORIES
COMPUTE EQUIP, RATIONS CLASS V & PETROL
COMPUTE UCM
PRINT UCM
PRINT VS & PT
COMPUTE VSP
VEHICLE REGISTRATION NUMBERS & TROOP BAGGAGE INFO
1

Figure 1

EMBARK SYSTEM (CONT)

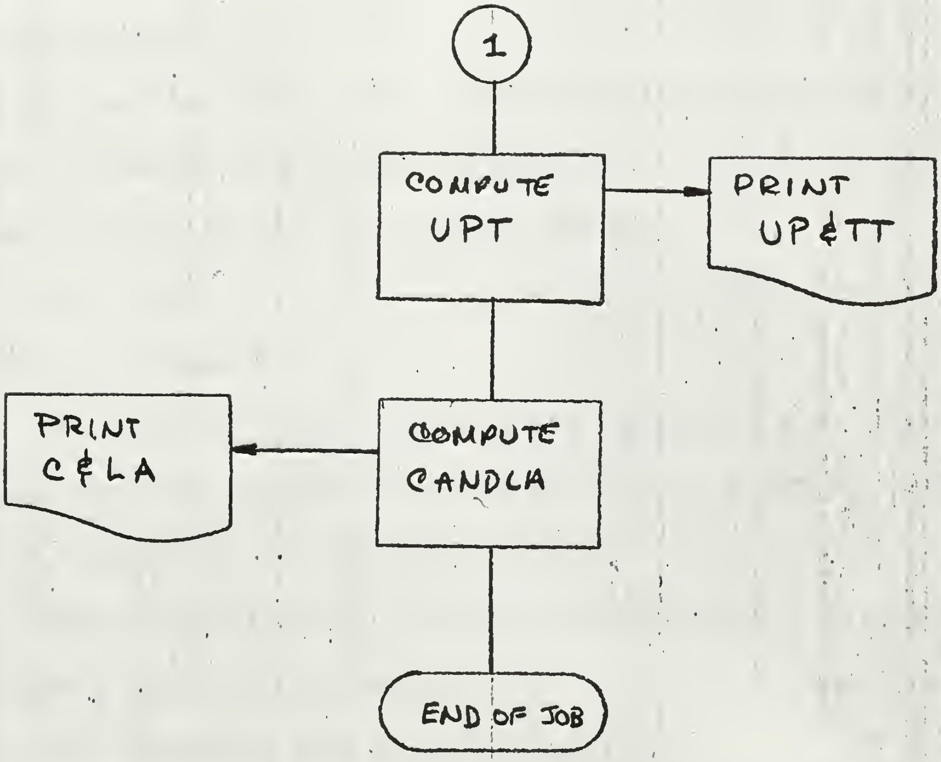


Figure 1 (cont.)

SECTION II

SEQUENCE OF PLANNING

Following the receipt of the initiating directive for an amphibious operation, the landing force embarkation planning begins at all echelons of command and proceeds concurrently. Usually, the major steps are accomplished in the following sequence:

A. Establishment of liaison between corresponding naval and troop levels of command.

B. Provision of planning data by the Amphibious Task Force Commander concerning the personnel and material of naval and other forces to be embarked with the landing force.

C. Determination by the Landing Force Commander of his assault and follow-up shipping requirements, and submission of these requirements to the Amphibious Task Force Commander.

D. Allocation of shipping by the Amphibious Task Force Commander.

E. Distribution of each ship's loading characteristics to the Landing Force Commander by the Amphibious Task Force Commander.

F. Establishment of the organizations for embarkation by the Landing Force Commander, including the designation of the Embarkation Team Commanders.

G. Establishment of the navy organization for the embarkation by the Amphibious Task Force Commander.

H. Allocation of shipping to subordinate echelons of the landing force by the Landing Force Commander.

I. Selection and preparation of the embarkation areas.

J. Determination of the control, security and communications facilities required during embarkation.

K. Landing Force Commander provides information on the number of days of fuel required, amount and type of ammunition, and the objectives assigned to each Embarkation Team Commander. This enables the Team Commander to decide what equipment he will require.

L. Development of berthing and loading schedules, and schedules for movement of personnel and material to embarkation areas.

M. Preparation, review, approval and promulgation of the detailed embarkation and loading plans.

The EMBARK system was designed to facilitate this final phase of planning. The system will accumulate the information required to prepare the Unit Cargo Manifest (UCM), Unit Personnel and Tonnage Tables (UP&TT), Cargo Loading and Analysis Form (C&LA), and Vehicle Summary and Priority Table (VS&PT). It will produce the forms for each unit, and the unit forms can be used to prepare the consolidated forms for the loading plan. Figure 2 shows the sequence of preparation and interrelationships of the loading forms, tables and diagrams comprising the completed loading plan.

The complete loading plans for each ship consist of the following forms, tables and diagrams:

1. The cover page of the loading plan gives the name of the ship and lists the embarking troop units. The Embarkation Team Commander indicates his approval of the tentative plan by signing this cover page. The completed plan is then delivered to the Commanding Officer of the ship, who, in turn, indicates his approval.

2. The Consolidated Embarkation and Tonnage Table lists all units embarked in a single ship together with the total personnel, total volume (cu. ft), area (sq. ft.) and total number of short tons of cargo.

3. The Consolidated Unit Personnel and Tonnage Table is a consolidation of the individual unit UP&TT's in the same format as the individual tables. It provides an accurate tabulation of personnel to be embarked and the exact amount and type of cargo to be loaded.

4. The Consolidated Cargo and Loading Analysis is a consolidation of the unit C&LA's. It provides the basis for stowage plans. In its final form the consolidated C&LA is, in fact, a complete listing of detailed stowage information of all cargo except vehicles. It is of vital importance to logistic control personnel during the ship-to-shore movement since it shows the stowage location of all cargo for each ship.

5. The Consolidated Vehicle Summary and Priority Table is a listing according to the unloading priority of all vehicles to be embarked in the ship. The unloading priority is determined by the Embarkation Team Commander after consideration and reconciliation of the unloading priorities desired by each embarking unit. He must also ensure that the priorities are in accordance with the priorities established by the landing plan. The Consolidated VS&PT is the basis for vehicle stowage plans. It is of value to persons concerned with the loading, unloading, and logistic control during the ship-to-shore movement.

6. The Consolidated Vehicle Table is a summary of all vehicles listed on the Consolidated VS&PT by types and by units to which they belong. It can be prepared easily from the unit VS&PT listings produced by EMBARKD.

7. Stowage diagrams show graphically the placement of cargo aboard ship. These diagrams give the exact location of vehicles and cargo within each cargo compartment. Their preparation is greatly simplified using the information provided by EMBARKD.

LOADING PLAN DIAGRAM

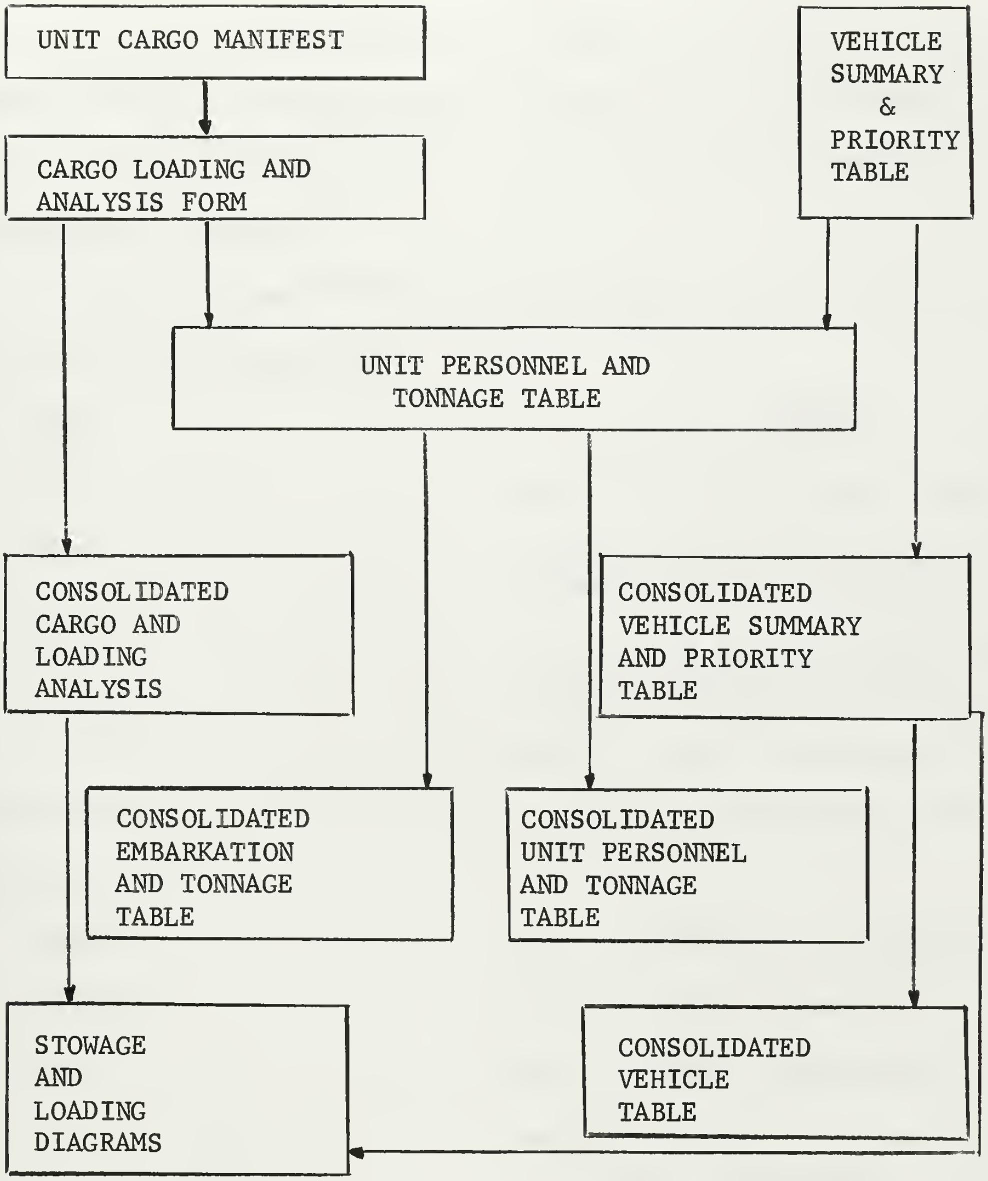

UNIT CARGO MANIFEST
CARGO LOADING AND ANALYSIS FORM
VEHICLE SUMMARY & PRIORITY TABLE
UNIT PERSONNEL AND TONNAGE TABLE
CONSOLIDATED CARGO AND LOADING ANALYSIS
CONSOLIDATED VEHICLE SUMMARY AND PRIORITY TABLE
CONSOLIDATED EMBARKATION AND TONNAGE TABLE
CONSOLIDATED UNIT PERSONNEL AND TONNAGE TABLE
STOWAGE AND LOADING DIAGRAMS
CONSOLIDATED VEHICLE TABLE

Figure 2

SECTION III

THE EMBARK SYSTEM

The EMBARK system consists actually of three computer programs (EMBARKD,MOUNTOUT and TABLE) which calculate and print summary data in the form required for preparation of the detailed loading plans of an amphibious operation.

The main program, EMBARKD, which prepares the forms uses the following major subroutines:

NAME	PURPOSE
UCM	Prepares the Unit Cargo Manifest
VSP	Prepares and prints the Vehicle Summary and Priority Table
UPT	Prepares and prints the Unit Personnel and Tonnage Table
CANDLA	Prepares Cargo and Loading Analysis

These subroutines, in turn, use one or more of the following minor subroutines:

CLASS V	Computes ammunition requirements
RATIONS	Computes ration requirements
WATER	Computes water requirements
PETROL	Computes petroleum, oil and lubricant requirements
EQUIP	Computes equipment requirements
WUCM	Prints Unit Cargo Manifest
WCANDLA	Prints Cargo Loading and Analysis Form

The two additional programs provided by the system are MOUNTOUT, which will print out a Table of Equipment for an infantry regiment and TABLE,

which will print-out the complete USMC Table of Allowances. Each program can write a report on the BCD output tape. (The tape assignments are as shown in Appendix A.)

The EMBARK system was programmed in Fortran II language and was designed to operate in conjunction with the Control Data Corporation (CDC) 1604 computer operating system called "Fortran '60 Monitor" [3]. EMBARK was programmed for a CDC 1604 computer having four tape units and off-line, card-to-tape, tape-to-printer facilities. The system requires the use of approximately 27,000 of the available 32,768 cells of memory. Emphasis was placed on achieving system flexibility, making the input preparation as simple as possible, and producing outputs that could be used directly as unit loading forms.

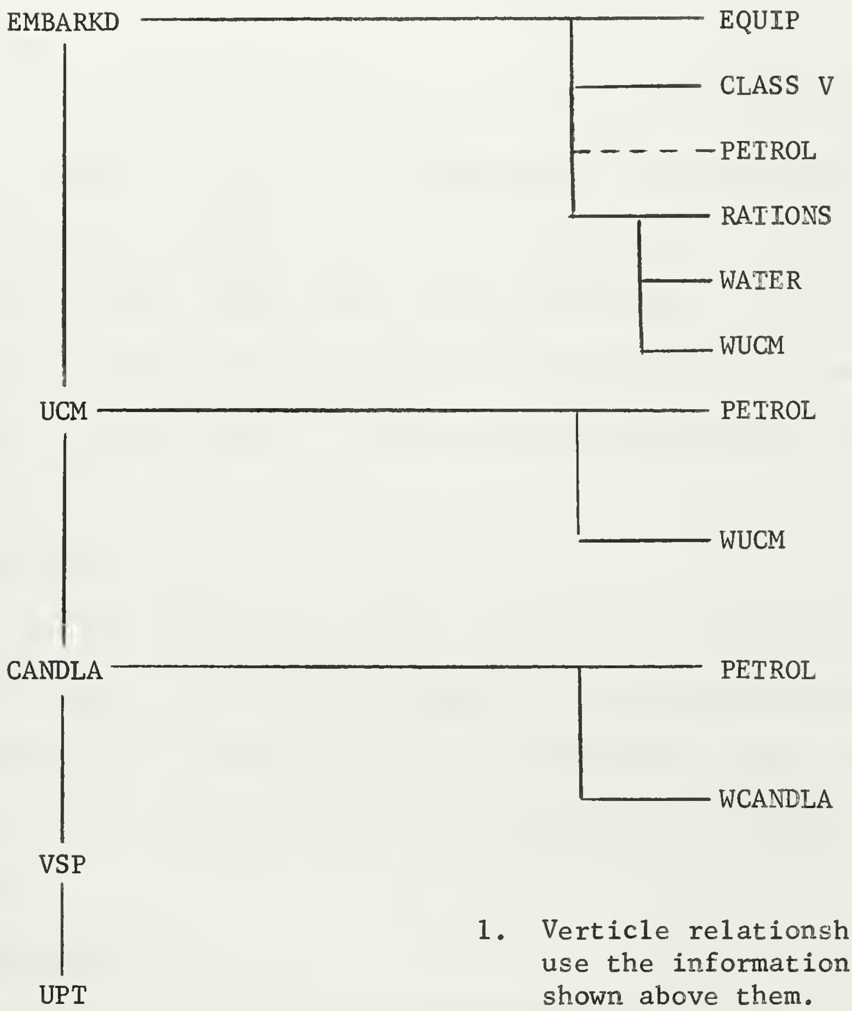
All of the equipment, supplies, units and ship types described in the input are specified by their standard Marine Corps nomenclature -- equipment and supplies by T/A number, units by T/O number, ship type by standard ship designators, etc.

A description is provided of the programs of the EMBARK system in terms of their input requirements, output reports, and computational procedures. The four main subroutines - UCM, UPT, VSP and CANDLA - are also described in detail, flow diagrams being included for them as well as for the programs. Since the remaining six subroutines -- CLASS V, RATIONS, WATER, PETROL, EQUIP, WUCM and WCANDLA merely rearrange information or print data, their flow diagrams or descriptions are not included. However, Fortran language listings of all these minor subroutines are given in Appendix B. Figure 3 shows the interrelationships between EMBARKD and the various subroutines.

The information needed to run problems on the computer is given in Appendix A, which includes a description of the additional control cards, tape assignments, and machine operating instructions.

All the tables of data, basic and computed, are stored in COMMON storage to permit greater utilization of the 1604 memory and to avoid lengthy CALL statements.

SCHEMATIC OF INTERRELATIONSHIP
BETWEEN THE SUBROUTINES OF EMBARKD



1. Verticle relationship - subroutines use the information from those shown above them.
2. Subroutines always called are indicated by solid line______.
3. Subroutines which may be called if required are indicated by dotted line - - -.

Figure 3

SECTION IV

PROGRAM EMBARKD

Purpose

Program EMBARKD calculates and prints the loading forms required for an amphibious operation loading plan. The program acts as a driver for the eleven subroutines: UCM, VSP, UPT, CANDLA, CLASS V, RATIONS, WATER, PETROL, EQUIP, WUCM and WCANDLA. The subroutines calculate the necessary information and actually print out the loading forms. Figure 3 shows the order in which the various subroutines are called.

Input Data

An input tape of the Table of Allowances and CLASS V information, this information is read into memory before calling the first subroutine [13] . Input consists of the normal T/E decks, each preceded by the four "Required" cards. See Appendix A for T/E deck input format.

Restrictions

Must be run under "Three-argument Monitor" control. See Appendix B.

Methodology

EMBARKD loads the Table of Allowances and CLASS V information into memory and then calls the subroutines which compute and print out the loading forms. Figure 4 shows the flow chart of EMBARKD and Figure 4A, the Fortran '60 listing.

Output

Examples of the output of EMBARKD are shown with the subroutines that actually print the unit loading forms.

Timing

A formula for EMBARKD running time cannot be given; however, the following experience may be of interest. It takes approximately three minutes to compile the program and takes an additional two minutes to print out the loading forms for an artillery regiment. Running time depends on the number of T/E decks for units in the embarkation movement.

1. SUBROUTINE UCM

Purpose

To compute and print out a Unit Cargo Manifest for an organization of any size. The print-out is provided actually by the subroutine WUCM. Also utilized are subroutines WATER, EQUIP and PETROL. The computed information is accumulated as input to subroutine UPT.

Input Data

Input is the normal T/E deck plus the four leading cards that must always be included. See Appendix A for input card format for the T/E deck.

Output Data Tapes

BCD output of UCM to be printed off-line, e.g., on an IBM 1403. This is the first output document printed out for any organization.

Restrictions

The T/E deck must not exceed 424 cards in total, however, T/E decks may be divided into segments of 420 cards with the four leading cards included in each segment.

Methodology

UCM loads the entire T/E deck into memory accumulating the T/A number of the equipment being embarked, the quantity of that equipment and the Vehicle Registration Number. The subroutine then matches the incoming T/A number of the T/E card with that number in store and extracts the number of square feet, cubic feet and the weight of the equipment. The program tests to see if the item weighs over 10,000 pounds. If it does, the subroutine computes an approximate height and stores this with the weight, number of cubic feet and number of square feet under Heavy Lifts. It also checks to see if an item has an area listed although it weighs less than 10,000 pounds. If so, the item is assigned to a Heavy Lift category. If the item is not a Heavy Lift, the subroutine then tests to see if the item weighs over 100 pounds; if so it stores the number of cubic feet and weight under Mobile-Loaded Cargo. If over 100 pounds and not a Heavy Lift, the item is considered as Standard Cargo and the number of cubic feet and weight are stored as Standard Cargo.

The subroutine then goes back and checks the next T/E item and repeats the cycle until all items have been handled. Then, the T/A numbers are broken down into groups by UP&TT line number classification and a Box Number is assigned to each item included in the UP&TT line number group. The subroutine reads the description from the information on the T/A card in memory, and totals all the Volume and Area information by UP&TT line number.

The subroutine WUCM then prints out this information, showing for each T/A number the UP&TT line number, Box Number, Description, number of Cubic Feet and Weight, as well as Square Feet and Height if item is a Heavy Lift. It prints totals for all UP&TT line numbers of the weight and number of cubic feet of those T/A numbers making up one UP&TT line category.

Figure 5 shows the flow chart for subroutine UCM and Figure 5A, the Fortran '60 listing.

Output

The output written by WUCM is the Unit Cargo Manifest, a sample of which is shown in Figure 5B.

2. SUBROUTINE VSP

Purpose

To compute and printout the Vehicle Summary and Priority Table for an organization of any size. The computed information is also accumulated for input to subroutine UPT.

Input Data

Input is the normal T/E deck with the four leading cards that must always be included. See Appendix A for T/E deck card input format.

Output Data Tapes

BCD output of VSP to be printed off-line, e.g., on an IBM 1403.

Restrictions

The T/E deck must not exceed 424 cards in total, however, T/E decks may be divided into segments of 420 cards with the four leading cards included in each segment.

Methodology

VSP reads the T/A Number, length, width, quantity and vehicle registration number from the incoming T/E card. Then it matches up with that T/A Number in store and extracts the information as to the weight, volume (cubic feet) and area (square feet) required for the vehicle. Next, the subroutine calculates the height of the vehicle by dividing the volume by the area. The vehicles are assigned priority numbers based on the order in which the cards are read by the computer. The subroutine then extracts the carrying capacity of the vehicle from the information under that T/A number in store, and assumes this to be the weight of cargo loaded in the vehicle. (Each vehicle is loaded to capacity.) Then the gross weight is calculated by adding to the net weight of the vehicle the weight of the cargo.

Having read the unit and ship information from the leading card of the T/E deck, the subroutine now prints out the Vehicle Summary and Priority Table listing all the vehicles by priority for unloading, including dimensions and weight for each vehicle.

Figure 6 shows the flow chart for VSP and Figure 6A, the Fortran '60 listing.

Input

See Appendix A for card input format.

Output

The output written by VSP is the Vehicle Summary and Priority Table, a sample page of which is shown in Figure 6B.

3. SUBROUTINE UPT

Purpose

To consolidate the information contained in the Unit Cargo Manifest and in the Vehicle Summary and Priority Table, plus a breakdown by the number and rank of personnel to be embarked. The subroutine prints out the UP&TT, subdividing the information into the personnel breakdown, classes of supplies indicating the total number of cubic feet and weight of each subclass, and the total number of square feet, cubic feet and weight of the total vehicles. The subroutine computes the total number of short tons and measurement tons of the cargo to be loaded.

Input Data

A T/E deck showing the T/O breakdown of personnel for units embarked. Also, the information which has been stored in the computer by the UCM and VSP subroutines after processing the T/E decks for those units embarked.

Output Data Tapes

BCD output of the UP&TT to be printed off-line, e.g., on an IBM 1403.

Restrictions

The T/E deck must not exceed 424 cards in total, however, the decks may be divided into segments of 420 cards with the four leading cards in each segment.

Methodology

UPT reads from the leading cards coming in with the T/E deck the breakdown of personnel for each unit. Also it obtains, from subroutines UCM and VSP, information on the number of cubic feet, weight and number of square feet of all the cargo as broken down into categories of UP&TT line number. The subroutine then divides the total weight of all items by 2000 to determine the number of short tons of cargo and divides the total number of cubic feet of all items by 40 to determine the number of measurement tons of cargo.

The subroutine prints out the Unit Personnel and Tonnage Table showing a breakdown of personnel, supplies and equipment, vehicles and grand totals of number of short tons, number of measurement tons, number of square feet, number of cubic feet and weight (in pounds) of all cargo to be loaded.

Figure 7 shows the flow chart for UPT and Figure 7A, the Fortran '60 listing.

Input

See Appendix A for the card input format.

Output

The output written by UP&TT is the Unit Personnel and Tonnage Table, a sample page of which is shown in Figure 7B.

4. SUBROUTINE CANDLA

Purpose

To compute and print out The Cargo Loading and Analysis form for an organization of any size. The print out is actually provided by

the subroutine WCANDLA.

Input Data

Input is the normal T/E deck plus the four leading cards that must always be included.

Output Data Tape

BCD output of CANDLA to be printed off-line, e.g., on an IBM 1403.

Restrictions

The T/E deck must not exceed 424 cards in total, however, T/E decks may be divided into segments of 420 cards with the four leading cards included in each segment.

Methodology

CANDLA loads the entire T/E deck into memory as in subroutine UCM and proceeds to classify the incoming information by the same method as that used in subroutine UCM. In addition to the information produced by subroutine UCM, CANDLA also calculates the number of rounds of ammunition, gallons of liquid, number of rations and the number of heavy lifts required. It totals each page and accumulates grand totals of the cubic feet and weight of standard cargo, the number of heavy lifts, square feet, height, number of cubic feet and weight of unitized cargo and heavy lifts. CANDLA also totals the number of cubic feet and weight of mobile-loaded cargo.

The subroutine WCANDLA then prints out this information showing for each T/A number the UP&TT line number, unit, description, number and type container, number of rounds of ammunition, gallons of liquid, cubic feet and weight of standard cargo, number of lifts and square

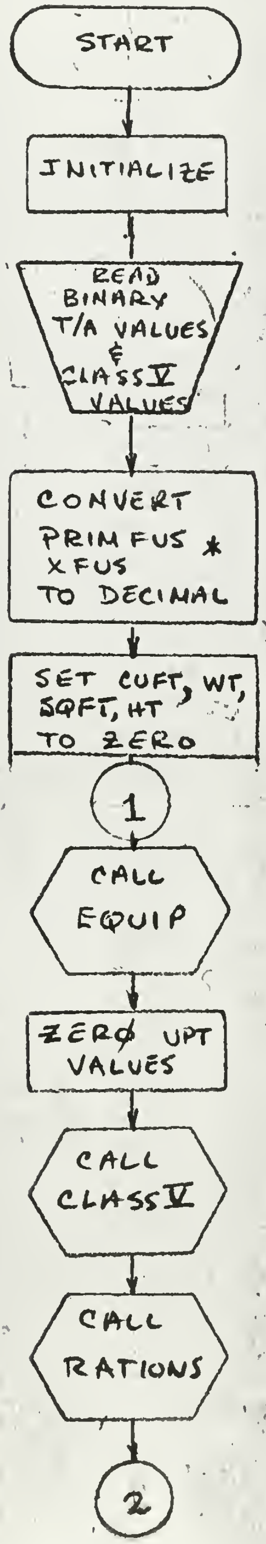
feet, height, cubic feet and weight of heavy lifts. It also shows for each T/A number the number of cubic feet and weight of mobile cargo. Page totals and grand totals of cargo are also provided.

Figure 8 shows the flow chart for subroutine CANDLA and Figure 8A, the Fortran '60 listing.

Output

The output written by WCANDLA is the Cargo and Loading Analysis, a sample of which is shown in Figure 8B.

PROGRAM EMBARKD


START
INITIALIZE
READ BINARY T/A VALUES & CLASS V VALUES
CONVERT PRIMFUS * XFUS TO DECIMAL
SET CUFT, WT, SQFT, HT TO ZERO
1
CALL EQUIP
ZERO UPT VALUES
CALL CLASS V
CALL RATIONS
2

* PRIMFUS - THE PRIME FUSES REQUIREMENT FOR AMMUNITION
XFUS - EXTRA FUSE REQUIREMENT

Figure 4

PROGRAM EMBARKD (CONT)

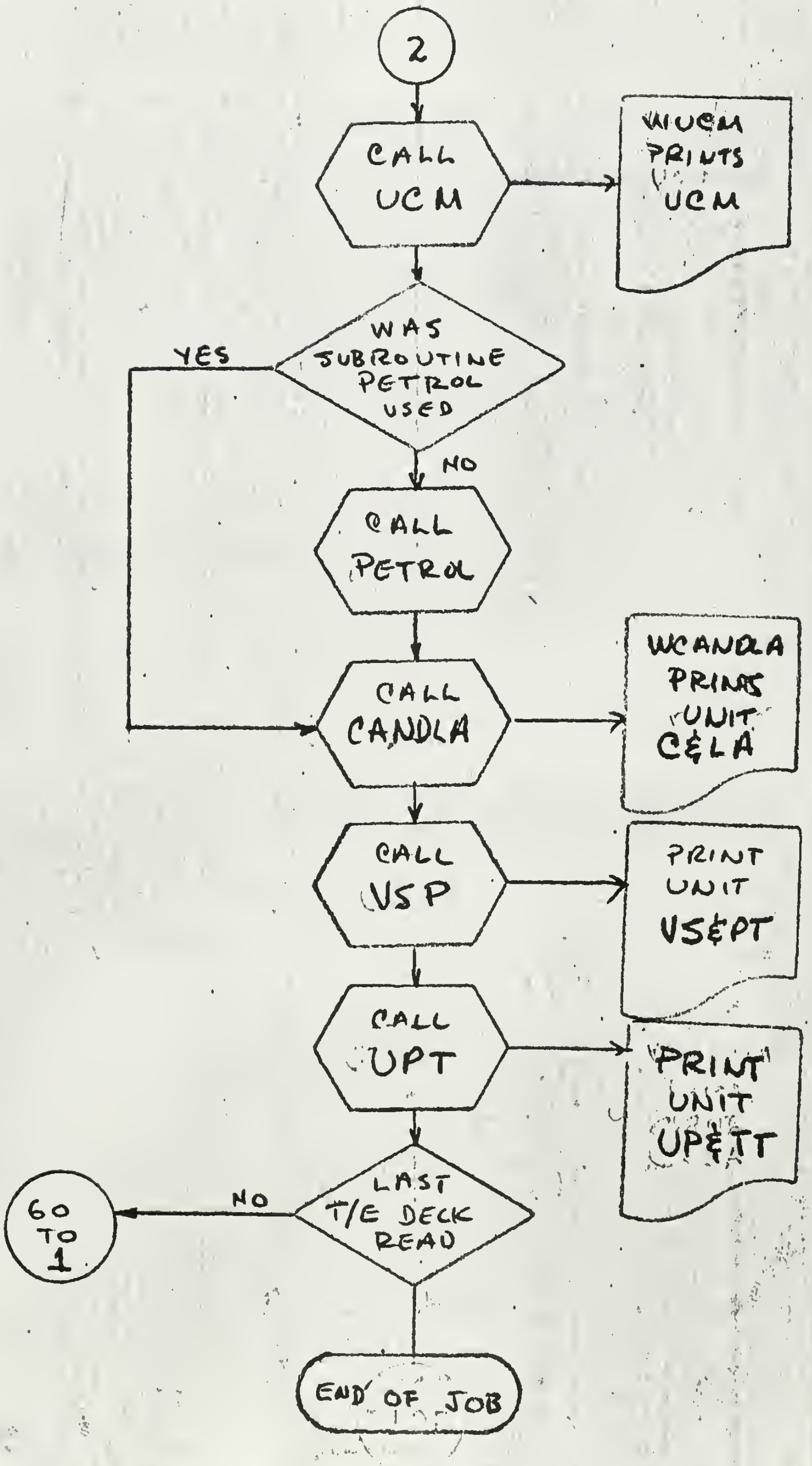


Figure 4 (cont.)

```
       PROGRAM EMBARKD
      0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
      1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
      2UNIT(420),IQTY(420),       MLD(420),LN(331),BA(331),D(331),
      3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
      4LNREF(331),SCUV(50),CUUPT(39),WTUPT(39),SHIP(4),CLASS(2),
      5NTOV(331),NTAV(331),XLD(100),KTA(100),SUM(7),MEN(13),TEMP(6),
      6STKNBR(2),WDESC(6),FLAGS(4),ITAV(50),SWTV(50)
C
      0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
      1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
      2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
      3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
      4DATE,SHIP,CRG,CLASS,NTOV,NTAV,N1,NC,M1,KV,LL,
      5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
       EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
      1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
      2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
      3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
      4(MEN(12),MET),(MEN(13),MTOT),
      5          (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
      6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
       M2=0
       D2=0.
       DO 33 J=1,1750
       ITANBR(J)=M2
       ISTDPKG(J)=M2
       DESC(J)=2020202020202020
       SQ(J)=D2
       CU(J)=D2
       WT(J)=D2
       CA(J)=D2
       FUEL(J)=D2
    33 GAL(J)=D2
       K=1
       J=-1
     1 J=J+1
       READ TAPE 3 ITANBR(J),STKNBR,CNBR,UNISS,ISTDPKG(J),STPROC,SQ(J),
      1CU(J),WT(J),CA(J),CTT,T,FUEL(J),GAL(J),TEMP,WDESC,XLD(K)
       DESC(J)=TEMP(1)
       IF (XLD(K)) 5,5,6
     6 KTA(K)=ITANBR(J)
       K=K+1
     5 IF(ITANBR(J)-99999) 1,4,4
     4 N1=J-1
       K1=K-1
       DO 44 I=1,331
    44 READ TAPE 3 ,LN(I),BA(I) ,D(I),D30,D60,PRIM(I),FUS(I),XFUS(I),
      1QTYV(I),WTV(I),CUV(I),KS,LNREF(I),NTOV(I),NTAV(I)
       FLAG=0.
       FLAG2=0.
       DO 7 I=1,331
       PRIM(I)=PRIM(I)/100.
       FUS(I)=FUS(I)/100.
     7 XFUS(I)=XFUS(I)/100.
C
  1000 CALL EQUIP
C
       NC=0
       DO 8 I=1,39
       CUUPT(I)=0.
     8 WTUPT(I)=0.
       SCU=0.
       SWT=0.
       SC=0.
       HT=0.
       HCU=0.
       HWT=0.
       XMCU=0.
       XMWT=0.
C
```

Figure 4A

```
      CALL CLASSV
C
      CALL UCM
C
      IF(FLAG2) 21,20,20
   20 CALL PETROL
   21 CALL VSP
C
      CALL UPT
C
      CALL CANDLA
C
      IF(FLAG)877,1000,1000
  877 END
```

Figure 4A (cont.)

SUBROUTINE UCM

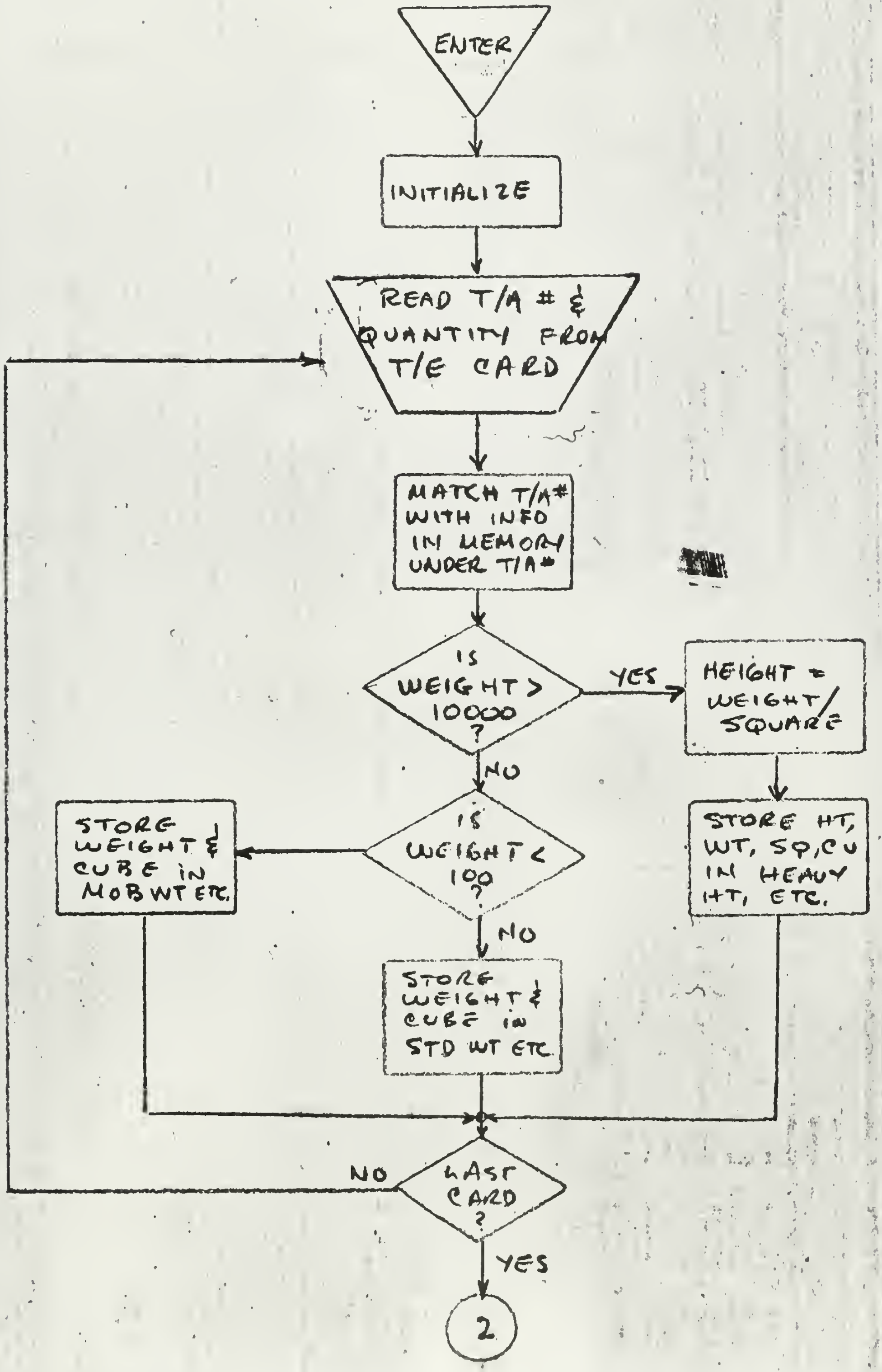

ENTER
INITIALIZE
READ T/A # & QUANTITY FROM T/E CARD
MATCH T/A# WITH INFO IN MEMORY UNDER T/A#
IS WEIGHT > 10000 ?
YES
HEIGHT = WEIGHT/SQUARE
STORE HT, WT, SQ, CU IN HEAVY HT, ETC.
NO
IS WEIGHT < 100 ?
STORE WEIGHT & CUBE IN MOBWT ETC.
NO
STORE WEIGHT & CUBE IN STD WT ETC.
NO
LAST CARD ?
YES
2

Figure 5

SUBROUTINE UCM

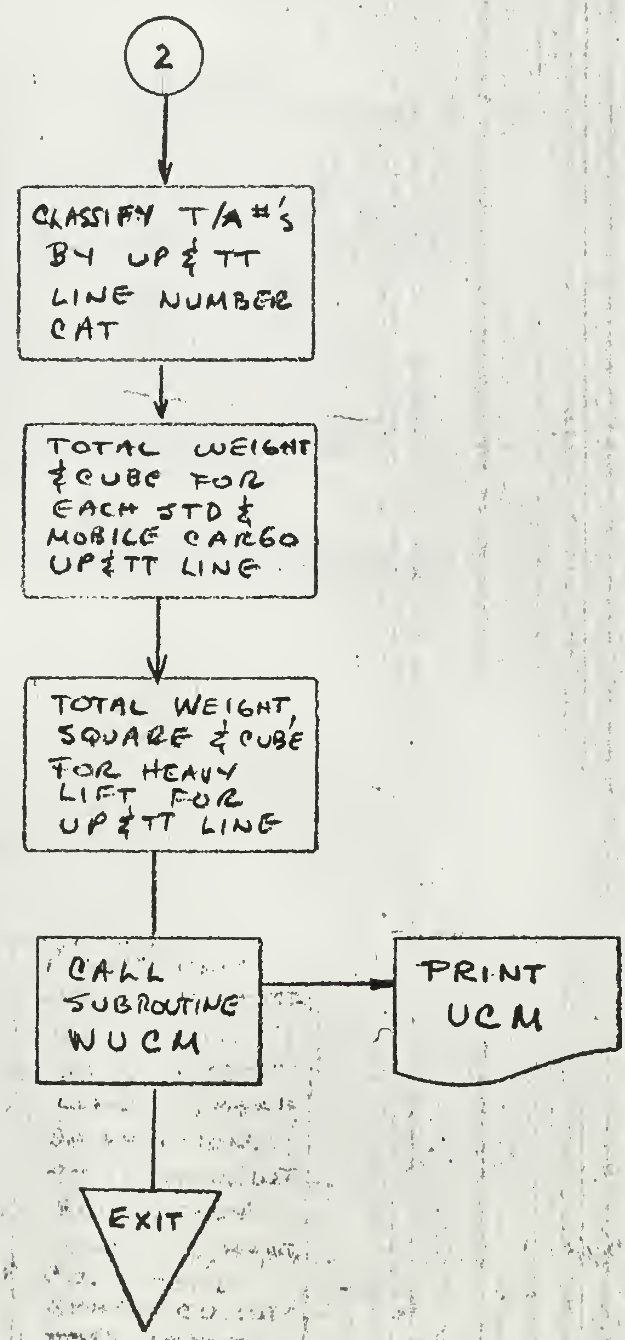

2
CLASSIFY T/A #'s BY UP & TT LINE NUMBER CAT
TOTAL WEIGHT & CUBE FOR EACH STD & MOBILE CARGO UP & TT LINE
TOTAL WEIGHT, SQUARE & CUBE FOR HEAVY LIFT FOR UP & TT LINE
CALL SUBROUTINE WUCM
PRINT UCM
EXIT

Figure 5 (cont.)

```
      SUBROUTINE UCM
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),         MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                    ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7       CLASS(2),NTOV(331),NTAV(331),
     8                XLD(100),KTA(100),
     9          SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,COAWT,COACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,ORG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5           (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
      LINE=73
      PRINT 1 CLASS,ORG,SHIP,DATE
    1 FORMAT(1X,2A8      , // 47X,25HUNIT CARGO MANIFEST (UCM) ,//,1X,
     17HUNIT - ,A5,27X,7HSHIP - ,(4A8),24X,7HDATE - ,A8,//)
      LINE=LINE+7
C
    9 DO 50 JJ=1,N1
      DO 50 II=1,M1
      IF(NTA(II)-ITANBR(JJ))50,10,50
   10 IN=IQTY(II)
      Q=IQTY(II)
      IF(NTA(II)-10999)55,55,11
   11 IF(NTA(II)-12999)60,60,12
   12 IF(NTA(II)-13999)64,64,13
   13 IF(NTA(II)-14999)62,62,14
   14 IF(NTA(II)-15999)66,66,15
   15 IF(NTA(II)-16999)68,68,16
   16 IF(NTA(II)-29999)60,60,17
   17 IF(NTA(II)-39999)64,64,18
   18 IF(NTA(II)-40999)62,62,19
   19 IF(NTA(II)-41999)62,62,20
   20 IF(NTA(II)-42999)75,75,21
   21 IF(NTA(II)-43999)62,62,22
   22 IF(NTA(II)-49999)62,62,23
   23 IF(NTA(II)-59999)66,66,24
   24 IF(NTA(II)-69999)68,68,25
   25 IF(NTA(II)-79999)70,70,26
   26 IF(NTA(II)-82999)71,71,27
   27 IF(NTA(II)-83999)72,72,28
   28 IF(NTA(II)-84239)73,73,29
   29 IF(NTA(II)-84519)73,73,30
   30 IF(NTA(II)-84999)73,73,31
   31 IF(NTA(II)-85999)74,74,32
   32 IF(NTA(II)-86999)76,76,50
   60 IF(ORG-UNIT(KK))61,59,61
   55 L=1
      GO TO 58
   59 L=5
      GO TO 58
C
   61 L=8
      GO TO 58
   62 IF(ORG-UNIT(KK))63,59,63
   63 L=10
      GO TO 58
```

Figure 5A

```
   64 IF(ORG-UNIT(KK))65,59,65
   65 L=9
      GC TO 58
   66 IF(ORG-UNIT(KK))67,59,67
   67 L=11
      GO TO 58
   68 IF(CRG-UNIT(KK))69,59,69
   69 L=12
      GO TO 58
   70 FLAG2=-1.
      CALL PETROL
      L=25
      CALL WUCM
      L=26
      GC TO 58
   71 L=16
      GC TO 58
   72 L=17
      GC TO 58
   73 L=18
      GO TO 58
   74 L=19
      GC TO 58
   75 L=13
      GO TO 58
   76 L=20
C
   58 LL=L
      CALL WUCM
      CUUPT(L)=CUUPT(L)+SUMSCU+SUMHCU+SUMXMCU
      WTUPT(L)=WTUPT(L)+SUMSWT+SUMHWT+SUMXMWT
      DO 100 L=1,7
  100 SUM(L)=0.
   50 CCNTINUE
C
      CUUPT(3)=CUUPT(1)+CUUPT(2)
      WTUPT(3)=WTUPT(1)+WTUPT(2)
      WTUPT(6)=WTUPT(4)+WTUPT(5)
      CUUPT(6)=CUUPT(4)+CUUPT(5)
      DO 80 L=8,14
      WTUPT(15)=WTUPT(15)+WTUPT(L)
   80 CUUPT(15)=CUUPT(15)+CUUPT(L)
      DO 81 L=16,22
      WTUPT(23)=WTUPT(23)+WTUPT(L)
   81 CUUPT(23)=CUUPT(23)+CUUPT(L)
     0CUUPT(38)=CUUPT(3)+CUUPT(6)+CUUPT (15)+CUUPT(23)+CUUPT (27)+
     1CUUPT(24)+CUUPT(33)+CUUPT(34)+CUUPT(37)+CUUPT(28)
     0WTUPT(38)=WTUPT(3)+WTUPT(6)+WTUPT (15)+WTUPT(23)+WTUPT (27)+
     1WTUPT(24)+WTUPT(33)+WTUPT(34)+WTUPT(37)+WTUPT(28)
      WTUPTT = WTUPT(38)+WTUPT(39)
      CUUPTT = CUUPT(38)+CUUPT(39)
      SQUPT  = SQUPT38 + SQUPT39
      STONS=WTUPTT/2000.
      XTONS=CUUPTT/40.
      END
```

Figure 5A (cont)

```
                                              UNIT CARGO MANIFEST (UCM)
 UNIT - ATH                             SHIP - ST CLAIR COUNTY  LST-1096
 4-01-64
 UP+TT  NBR BOX    DESC                                          STANDARD CARGO      UNITIZED CARGO           MOBILE
 LIN NO                                                                                   HEAVY LIFTS              LOAD
                                                                 CUFT    WT(LB)   SQFT    HT   CUFT      WT       CUFT   WT(LB
...........................................................................................................................
     1       1   MEAL, CO                                       231.0   5040.0      .     .0     .0       .0        .0      .0
...........................................................................................................................
                                               LINE TOTALS      231.0   5040.0      .            .0       .0        .0      .0
...........................................................................................................................
     8       2   AMPLIFIE                                          .0       .0      .     .0     .0       .0       4.8   120.0
     8       2   ANTENNA                                           .0       .0      .     .0     .0       .0       7.8   144.0
     8       2   AXLE RL-                                         7.8    310.0      .     .0     .0       .0        .0      .0
     8       1   CHANNEL                                          6.8    145.0      .     .0     .0       .0        .0      .0
     8       3   CONTROL                                           .0       .0      .     .0     .0       .0      10.0   183.0
     8       1   FREQUENC                                          .0       .0      .     .0     .0       .0       5.7    93.0
     8       1                                                     .0    650.0      .     .0     .0       .0        .0      .0
     8       1                                                    5.0    136.0      .     .0     .0       .0        .0      .0
     8       2                                                   14.0    250.0      .     .0     .0       .0        .0      .0
     8       2                                                     .0       .0      .     .0     .0       .0      16.0      .0
     8       2                                                     .0       .0      .     .0     .0       .0       4.0    46.0
     8       1                                                     .0       .0      .     .0     .0       .0       3.0    93.0
     8       1                                                    8.2    364.0      .     .0     .0       .0        .0      .0
     8       1                                                   17.0    364.0      .     .0     .0       .0        .0      .0
     8       1                                                    8.0    180.0      .     .0     .0       .0        .0      .0
     8       4                                                     .0       .0      .     .0     .0       .0       4.0    60.0
     8       8                                                     .0       .0      .     .0     .0       .0      16.0   200.0
     8       8                                                     .0       .0      .     .0     .0       .0       6.4   112.0
     8      25                                                     .0       .0      .     .0     .0       .0      75.0  1700.0
     8       2                                                   22.6    442.0      .     .0     .0       .0        .0      .0
     8       1                                                     .0       .0    84.    4.3  360.0   3865.0        .0      .0
     8       1                                                     .0       .0   840.     .4  360.0   3865.0        .0      .0
     8       1                                                     .0       .0     4.   90.0  360.0       .0        .0      .0
     8       4                                                     .0       .0      .     .0     .0       .0      20.0   228.0
     8       6                                                     .0       .0      .     .0     .0       .0      36.0   600.0
     8       1                                                     .0       .0      .     .0     .0       .0        .0      .0
     8       2                                                     .0       .0      .     .0     .0       .0      10.0   200.0
     8       1                                                    7.0    121.0      .     .0     .0       .0        .0      .0
     8       2                                                     .0       .0      .     .0     .0       .0       6.0   110.0
     8      16                                                     .0       .0      .     .0     .0       .0      16.0   224.0
     8       1                                                     .0       .0      .     .0     .0       .0        .9    20.0
     8       2                                                     .0       .0      .     .0     .0       .0      10.0   180.0
     8       1                                                     .0       .0      .     .0     .0       .0        .3    15.0
     8       7                                                     .0       .0      .     .0     .0       .0      14.0   385.0
     8       1                                                     .0       .0      .     .0     .0       .0       2.0    40.0
...........................................................................................................................
                                               LINE TOTALS       96.4   2962.0   928.         1080.0   7730.0     267.9  4753.0
...........................................................................................................................
```

Figure 5 B

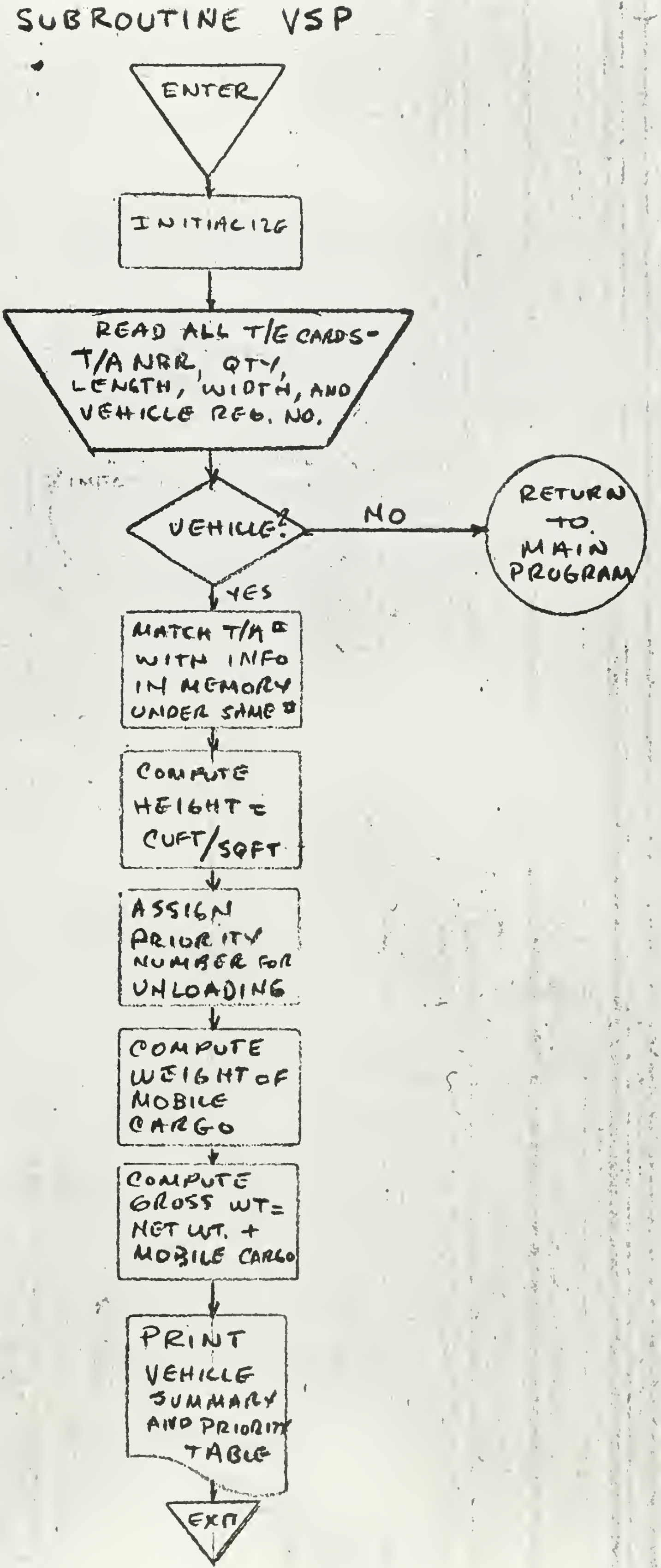

SUBROUTINE VSP
ENTER
INITIALIZE
READ ALL T/E CARDS - T/A NBR, QTY, LENGTH, WIDTH, AND VEHICLE REG. NO.
VEHICLE?
NO
RETURN TO MAIN PROGRAM
YES
MATCH T/A # WITH INFO IN MEMORY UNDER SAME #
COMPUTE HEIGHT = CUFT/SQFT
ASSIGN PRIORITY NUMBER FOR UNLOADING
COMPUTE WEIGHT OF MOBILE CARGO
COMPUTE GROSS WT = NET WT. + MOBILE CARGO
PRINT VEHICLE SUMMARY AND PRIORITY TABLE
EXIT

Figure 6

```
      SUBRCUTINE VSP
C
     ODIMENSION ITANBR(1750),ISTDPKG(175C),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),       MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                 ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7      CLASS(2),NTOV(331),NTAV(331),
     8                XLD(1CO),KTA(100),
     9         SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     OCCMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,DOAWT,COACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STCNS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,ORG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5            (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
      SSQP=0.
      SCUP=0.
      SWTP=0.
      SXP=0.
      SGWTP=0.
      SSQG=0.
      SCUG=0.
      SWTG=0.
      SXG=0.
      SGWTG=0.
      K=1
      NPAGE =1
      PRINT 99
   99 FCRMAT(1H1)
      PRINT 98 CLASS, NPAGE
   98 FORMAT(1X,2A8  ,95X, 4HPAGE, I3/)
      PRINT 97 ORG,SHIP
   970FCRMAT(39X43HVEHICLE SUMMARY AND PRIORITY TABLE (VS+PT)    //1X,
     1 7HUNIT - ,A5//1X, 7HSHIP - ,4A8/)
      PRINT 96
   960FCRMAT(1X, 44HUNLOAD  LANDING     TYPE      UNIT   VEHICLE
     122HLENGTH  WIDTH  HEIGHT  32HSQFT  CUFT  NET WT  CARGO(LB)    ,2X,
     216HGROSS WT  WHERE /1X,
     3            45HPRIORITY SERIAL  VEHICLE               REGISTRA-
     422H                       32H               (LB)OF  LOADED IN    ,2X,
     516H(LB) OF   STOWED/1X,
     6            45HNUMBER   NUMBER                        TION NO.
     722H                       32H               VEHICLE  VEHICLE     ,2X,
     816HVEHICLE           )
      PRINT 95
   95 FORMAT(120H.................................................
     1................................................................)
      LINE=12
C                  N1 = NUMBER OF T/A ITEMS
C                  M1 = NUMBER OF T/E ITEMS
      DC 100 I=1,M1
      CC 100 J=1,N1
      IF(ITANBR(J)-NTA(I)) 100,5,100
    5 IF(SQ(J)) 100,100,6
    6 IF(30000-ITANBR(J)) 2,11,100
    2 IF (39999-ITANBR(J)) 3,11,11
    3 IF (50000-ITANBR(J)) 4,11,100
    4 IF (69999-ITANBR(J)) 100,11,11
   11 HT=CU(J)/SC(J)
C  GET CARRYING CAPACITY OF VEHICLE
```

Figure 6A

```
      DO 12 L=1,K1
      IF (NTA(I)-KTA(L)) 12,13,12
   13 XMOBWT=XLD(L)
   12 CONTINUE
      GWT=XMOBWT+WT(J)
      PRINT 7 K,DESC(J),UNIT(I),MLD(I),HT,SQ(J),CU(J),WT(J),XMOBWT,GWT
    7 FORMAT(     10X,I3,5X,A8,4X,A5,2X,A8,13X,3F7.1,3F10.1,10X)
      LINE=LINE+1
      SSQP=SSQP+SQ(J)
      SCUP=SCUP+CU(J)
      SWTP=SWTP+WT(J)
      SXP=SXP+XMOBWT
      SGWTP=SGWTP+GWT
      SSQG=SSQG+SSQP
      SCUG=SCUG+SCUP
      SXG=SXG+SXP
      SWTG=SWTG+SWTP
      SGWTG=SGWTG+SGWTP
      XMOBWT=0.
      GWT=0.
      HT=0.
      IF(77-LINE) 9,9,100
    9 PRINT 10 SSQP,SCUP,SWTP,SXP,SGWTP
      SSQP=0.
      SCUP=0.
      SWTP=0.
      SXP=0.
      SGWTP=0.
   10 FORMAT(68X,F4.1,3F10.1,10X)
      PRINT 10 SSQG,SCUG,SWTG,SXG,SGWTG
      PRINT 8
    8 FORMAT(/40X,33HBLAND/HANSEN THESIS -EMBARK- 1964 ,1H1)
      NPAGE=NPAGE+1
      PRINT 98 CLASS,NPAGE
      PRINT 96
      PRINT 95
      LINE=6
  100 CONTINUE
      RETURN
      END
```

Figure 6A (cont.)

```
                                          VEHICLE SUMMARY AND PRIORITY TABLE (VS+PT)
UNIT - H1551

SHIP - ST CLAIR COUNTY  LST-1C96

UNLOAD  LANDING    TYPE    NO UNIT      VEHICLE LENGTH  WIDTH  HEIGHT SQFT   CUFT   NET WT  CARGO(LB)      GROSS WT  WHERE
PRIORITY SERIAL  VEHICLE VEH            REGISTRA-                                   (LB)OF  LOADED IN      (LB) OF    STOWED
NUMBER   NUMBER                         TION NO.                                    VEHICLE  VEHICLE       VEHICLE
.............................................................................................................................
             1                1 H1551                               5.1    33.0   168.2    880.0         .0     880.0
             2                1 H1551                               3.3    30.0    98.0    790.0         .0     790.0
             3                1 H1551                               3.6    43.0   155.4    565.0      500.0    1065.0
             4                1 H1551   300A                        5.0   104.0   520.0   1340.0     1500.0    2840.0
             5                1 H1551   301D                        5.0   104.0   520.0   1340.0     1500.0    2840.0
             6                1 H1551   302F                        5.0   104.0   520.0   1340.0     1500.0    2840.0
             7                1 H1551   303H                        5.0   104.0   520.0   1340.0     1500.0    2840.0
             8                1 H1551   304H                        5.0   104.0   520.0   1340.0     1500.0    2840.0
             9                1 H1551   305M                        5.0   104.0   520.0   1340.0     1500.0    2840.0
            10                1 H1551   306N                        5.0   104.0   520.0   1340.0     1500.0    2840.0
            11                1 H1551   307N                        5.0   104.0   520.0   1340.0     1500.0    2840.0
            12                1 H1551   400D                        4.6   102.0   471.0   2750.0     3000.0    5750.0
            13                1 H1551   401H                        4.6   102.0   471.0   2750.0     3000.0    5750.0
            14                1 H1551   402P                        4.6   102.0   471.0   2750.0     3000.0    5750.0
            15                1 H1551   403G                        4.6   102.0   471.0   2750.0     3000.0    5750.0
            16                1 H1551   404Y                        4.6   102.0   471.0   2750.0     3000.0    5750.0
            17                1 H1551                               6.4    94.0   606.0   2280.0         .0    2280.0
            18                1 H1551   105C                       17.4    65.0  1133.0   2963.0         .0    2963.0
            19                1 H1551   106H                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            20                1 H1551   107N                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            21                1 H1551   108H                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            22                1 H1551   109Y                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            23                1 H1551   111A                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            24                1 H1551   112H                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            25                1 H1551   113I                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            26                1 H1551   115N                        5.3    97.0   510.0   5950.0     1500.0    7450.0
            27                1 H1551   700X                        6.7   184.0  1224.0  12880.0     5000.0   17880.0
            28                1 H1551   701T                        6.7   184.0  1224.0  12880.0     5000.0   17880.0
            29                1 H1551   702H                        6.7   184.0  1224.0  12880.0     5000.0   17880.0
            30                1 H1551   703Y                        6.7   184.0  1224.0  12880.0     5000.0   17880.0
            31                1 H1551   704G                        6.7   184.0  1224.0  12880.0     5000.0   17880.0
            32                1 H1551   705F                        6.7   184.0  1224.0  12880.0     5000.0   17880.0
            33                1 H1551   500R                        6.1    45.0   274.0   1700.0         .0    1700.0
            34                1 H1551   501E                        6.1    45.0   274.0   1700.0         .0    1700.0
            35                1 H1551   502Q                        6.1    45.0   274.0   1700.0         .0    1700.0
            36                1 H1551   503G                        6.1    45.0   274.0   1700.0         .0    1700.0
            37                1 H1551   505H                        6.1    45.0   274.0   1700.0         .0    1700.0
            38                1 H1551   506W                        6.1    45.0   274.0   1700.0         .0    1700.0
            39                1 H1551   507V                        6.1    45.0   274.0   1700.0         .0    1700.0
            40                1 H1551   508N                        6.1    45.0   274.0   1700.0         .0    1700.0
.............................................................................................................................
                                                GRAND TOTALS        3847.0 22291.6  170428.0    69500.0  239928.0
.............................................................................................................................
                                         BLAND/HANSEN THESIS -EMBARK- 1964
```

Figure 6 B

SUBROUTINE: UPTT

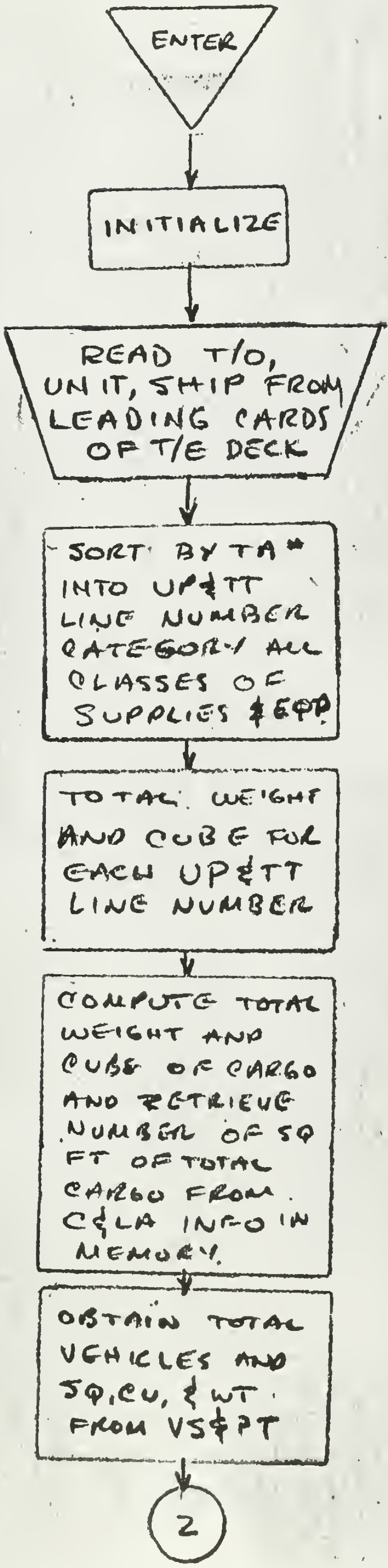

ENTER
INITIALIZE
READ T/O, UNIT, SHIP FROM LEADING CARDS OF T/E DECK
SORT BY TA* INTO UP&TT LINE NUMBER CATEGORY/ ALL CLASSES OF SUPPLIES & EQP
TOTAL WEIGHT AND CUBE FOR EACH UP&TT LINE NUMBER
COMPUTE TOTAL WEIGHT AND CUBE OF CARGO AND RETRIEVE NUMBER OF SQ FT OF TOTAL CARGO FROM C&LA INFO IN MEMORY.
OBTAIN TOTAL VEHICLES AND SQ, CU, & WT FROM VS&PT
2

Figure 7

SUBROUTINE UPTT

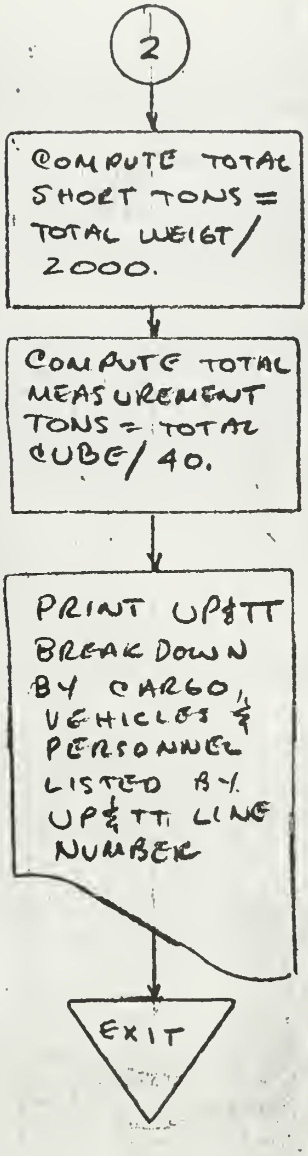

2
COMPUTE TOTAL SHORT TONS = TOTAL WEIGT/ 2000.
COMPUTE TOTAL MEASUREMENT TONS = TOTAL CUBE/ 40.
PRINT UP&TT BREAK DOWN BY CARGO, VEHICLES & PERSONNEL LISTED BY UP&TT LINE NUMBER
EXIT

Figure 7 (cont.)

]

```
      SUBROUTINE UPT
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),        MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                    ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7         CLASS(2),NTOV(331),NTAV(331),
     8                XLD(100),KTA(100),
     9           SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,ORG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5             (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
      STONS=WTUPT(39)/2000.
      XTONS=CUUPT(39)/40.
      SQUPT=SQUPT38+SQUPT39
      CUUPTT=CUUPT(38)+CUUPT(39)
      WTUPTT=WTUPT(38)+WTUPT(39)
  900 PRINT 901 CLASS
  901 FORMAT(1H1//2X,2A8,/40X ,40HUNIT PERSONNEL AND TONNAGE TABLE (UP,T
     1T)/)
      PRINT 41
   41 FORMAT(120H.......................................................
     1.........................................................)
      PRINT 903 MO7,MO6,MO5,MO4,MO3,MO1,MW,MOT
  9030FORMAT(2X,11HOFFICERS - ,4HGEN=,I5,3X,4HCOL=,I5,3X,6HLTCOL=,I5,3X,
     14HMAJ=,I5,3X,5HCAPT=,I5,3X,3HLT=,I4,2X(3HWO=,I5,2X,15HTOTAL OFFICE
     2RS=,I5/)
      PRINT 904 ME7,ME5,ME1,MET
  9040FORMAT(2X,11HENLISTED - ,5HMSGT=,I4,3X,17HOTHER STAFF NCOS=,I5,14X
     1,15HOTHER ENLISTED= ,I7,12X,15HTOTAL ENLISTED= ,I5/)
      PRINT 905 MTOT
  905 FORMAT(99X,11HTOTAL PERS=,I5)
      PRINT 41
      PRINT 906
  906 FORMAT(49X,21HCARGO (LESS VEHICLES))
      PRINT 907
  907 FORMAT(/,2X,6HSUPPLY,3X,4HLINE,39X,11HDESCRIPTION,37X,5HCU FT,
     14X,7HWT (LB)/2X,5HCLASS,5X,3HNO.)
      PRINT 41
      PRINT 908 (L,CUUPT(L),WTUPT(L),L=1,3)
  908 FORMAT(13X,I2,2X,7HRATIONS,74X,F8.0,F10.0/5X,1HI,7X,I2,
     12X,5HWATER,76X,F8.0,F10.0/13X,I2,2X,13HTOTAL CLASS I,68X,
     2F8.0,F10.0)
      PRINT 41
      PRINT 909 (L,CUUPT(L),WTUPT(L),L=4,6)
  909 FORMAT(2X,5HII IV,43X,21HAUTHORIZED ALLOWANCES/2X,7HMEDICAL,I6,
     12X,17HTROOP SPACE CARGO,64X,F8.0,F10.0/4X,3HAND,I8,2X,
     211HOTHER CARGO,70X,F8.0,F10.0/2X,6HDENTAL,I7,2X,
     354HTOTAL CLASS II, IV, MEDICAL AND DENTAL (LESS VEHICLES),27X,
     4F8.0,F10.0)
      PRINT 41
      PRINT 910 (L,CUUPT(L),WTUPT(L),L=7,7)
  910 FORMAT(2X,7HIIA,IVA,I6,2X,17HAVIATION MATERIAL,64X,F8.0,F10.0)
      PRINT 41
      PRINT 911 (L,CUUPT(L),WTUPT(L),L=8,15)
  911 FORMAT(54X,13HREPLENISHMENT/13X,I2,2X,20HELECTRONICS (SIGNAL),61X,
```

Figure 7A

```
   1F8.0,F10.0/13X,I2,2X,8HENGINEER,73X,F8.0,F10.0/13XI2,2X,
   219HGENERAL SUPPLY (QM),62X,F8.0,F10.0/5X,2HII,6X,I2,2X,
   315HMOTOR TRANSPORT,66X,F8.0,F10.0/13X,I2,2X,8HORDNANCE,73X,F8.0,
   4F10.0/13X,I2,2X,34HCHEMICAL (LESS INFLAMMABLE AGENTS),47X,F8.0,F10
   5.0/13X,I2,2X,5HOTHER,76X,F8.0,F10.0/13X,I2,2X,14HTOTAL CLASS II,
   667X,F8.0,F10.0)
    PRINT 41
    PRINT 912 (L,CUUPT(L),WTUPT(L),L=16,23)
912 FORMAT(13X,I2,2X,20HELECTRONICS (SIGNAL),61X,F8.0,F10.0/13X,I2,2X,
   18HENGINEER,73X,F8.0,F10.0/13X,I2,2X,44HGENERAL SUPPLY (QM) (LESS E
   2XCHANGE SUPPLIES),37X,F8.0,F10.0/5X,2HIV,6X,I2,2X,15HMOTOR TRANSPO
   3RT,66X,F8.0,F10.0/13X,I2,2X,8HORDNANCE,73X,F8.0,F10.0/13X,I2,2X(
   434HCHEMICAL (LESS INFLAMMABLE AGENTS),47X,F8.0,F10.0/13X,I2,2X,
   55HOTHER,76X,F8.0,F10.0/13X,I2,2X,14HTOTAL CLASS IV 67X,F8.0,F10.0)
    PRINT 41
    PRINT 910 (L,CUUPT(L),WTUPT(L),L=24,24)
    PRINT 41
    PRINT 913 (L,CUUPT(L),WTUPT(L),L=25,27)
913 FORMAT (59X,3HPOL/13X,I2,2X,21HGASOLINE AND KEROSENE,60X,F8.0,F10.
   10/4X,3HIII,6X,I2,2X,9HOTHER POL,72X,F8.0,F10.0/13X,I2,2X,
   215HTOTAL CLASS III,66X,F8.0,F10.0)
    PRINT 41
    PRINT 914 (L,CUUPT(L),WTUPT(L),L=28,28)
914 FORMAT(4X,4HIIIA,5X,I2,2X,29HAIRCRAFT FUELS AND LUBRICANTS,52X,
   1F8.0,F10.0)
    PRINT 41
    PRINT 915 (L,CUUPT(L),WTUPT(L),L=29,33)
915 FORMAT(55X,10HAMMUNITION/13X,I2,2X,10HSMALL ARMS,71X,F8.0,F10.0/
   113X,I2,2X,15HHIGH EXPLOSIVES,66X,F8.0,F10.0,/4X,1HV,8X,I2,2X,
   247HINFLAMMABLES (PYROTECHNICS AND CHEMICAL AGENTS),34X,F8.0,F10.0/
   313X,I2,2X,15HNUCLEAR WEAPONS,66X,F8.0,F10.0/13X,I2,2X,
   413HTOTAL CLASS V,68X,F8.0,F10.0)
    PRINT 41
    PRINT 916 (L,CUUPT(L),WTUPT(L),L=34,34)
916 FORMAT(4X,2HVA,7X,I2,2X,19HAIRCRAFT AMMUNITION,62X,F8.0,F10.0)
    PRINT 41
    PRINT 917 (L,CUUPT(L),WTUPT(L),L=35,37)
917 FORMAT(53X,14HOTHER SUPPLIES/13X,I2,2X,17HEXCHANGE SUPPLIES,64X,
   1F8.0,F10.0/13X,I2,2X,18HMEDICAL AND DENTAL,63X,F8.0,F10.0/
   213X,I2,2X,20HTOTAL OTHER SUPPLIES,61X,F8.0,F10.0)
    PRINT 41
    PRINT 918 (L,SQUPT38,CUUPT(L),WTUPT(L),L=38,38)
918 FORMAT(13X,I2,2X,67HTOTAL CARGO (ADD LINES 3, 6, 7, 15, 23, 24, 27
   1, 28, 33, 34, AND 37),7X,6HSQ FT./17X,52H(SQ FT. OF UNITIZED CARGO
   2 AND HEAVY LIFTS FROM C+LA),17X,F8.0,4X,F8.0,F10.0)
    PRINT 41
    PRINT 919
919 FORMAT(56X,8HVEHICLES)
    PRINT 920 (L,SQUPT39,CUUPT(L),WTUPT(L),L=39,39)
920 FORMAT(2X,6HII IIA/2X,6HAND IV,I7,2X,14HTOTAL VEHICLES,55X,F8.0,
   14X,F8.0,F10.0)
    PRINT 41
    PRINT 921 STONS,XTONS,SQUPT ,CUUPTT,WTUPTT
9210FORMAT(2X,15HGRAND TOTALS - ,F10.3,11H SHORT TONS,3X,F14.3,
   1 17H MEASUREMENT TONS,14X,F8.0,4X,F8.0,F10.0)
    PRINT 41
    PRINT 922 ORG ,SHIP,CLASS
9220FORMAT(/4X,7HUNIT - ,A5,44X ,42HCERTIFIED - .........................
   1......../4X,7HSHIP - 4A8,22X,19HDATE - .............//104X,2A8)
    PRINT 999
999 FORMAT(1H1)
    END
```

Figure 7A

```
                                  UNIT PERSONNEL AND TONNAGE TABLE (UP+TT)
..............................................................................................................................
 OFFICERS - GEN=    0   COL=    1   LTC L=    1    MAJ=    3    CAPT=   10    LT=    7   WO=   10   TOTAL OFFICERS=    32
 ENLISTED - MSGT=   6   OTHER STAFF NCOS=   20                OTHER ENLISTED=    185               TOTAL ENLISTED=   211
                                                                                                     TOTAL PERS=   243
..............................................................................................................................
                                               CARGO (LESS VEHICLES)
 SUPPLY   LINE                                      DESCRIPTION                                         CU FT     WT (LB)
 CLASS     NO.
..............................................................................................................................
             1  RATIONS                                                                                  321.       8311.
   I         2  WATER                                                                                       .           .
             3  TOTAL CLASS I                                                                            321.       8311.
..............................................................................................................................
 II IV                                          AUTHORIZED ALLOWANCES
 MEDICAL     4  TROOP SPACE CARGO                                                                           .           .
   AND       5  OTHER CARGO                                                                                 .           .
 DENTAL      6  TOTAL CLASS II, IV, MEDICAL AND DENTAL (LESS VEHICLES)                                      .           .
..............................................................................................................................
 IIA,IVA     7  AVIATION MATERIAL                                                                           .           .
..............................................................................................................................
                                                     REPLENISHMENT
             8  ELECTRONICS (SIGNAL)                                                                   12753.      77544.
             9  ENGINEER                                                                                    .           .
            10  GENERAL SUPPLY (QM)                                                                     1439.      26479.
   II       11  MOTOR TRANSPORT                                                                             .           .
            12  ORDNANCE                                                                                    .           .
            13  CHEMICAL (LESS INFLAMMABLE AGENTS)                                                        95.       1498.
            14  OTHER                                                                                       .           .
            15  TOTAL CLASS II                                                                         14287.     105521.
..............................................................................................................................
            16  ELECTRONICS (SIGNAL)                                                                        .           .
            17  ENGINEER                                                                                    .           .
            18  GENERAL SUPPLY (QM) (LESS EXCHANGE SUPPLIES)                                                .           .
   IV       19  MOTOR TRANSPORT                                                                             .           .
            20  ORDNANCE                                                                                    .           .
            21  CHEMICAL (LESS INFLAMMABLE AGENTS)                                                          .           .
            22  OTHER                                                                                       .           .
            23  TOTAL CLASS IV                                                                              .           .
..............................................................................................................................
            36  MEDICAL AND DENTAL                                                                          .           .
            37  TOTAL OTHER SUPPLIES                                                                        .           .
..............................................................................................................................
            38  TOTAL CARGO (ADD LINES 3, 6, 7, 15, 23, 24, 27, 28, 33, 34, AND 37)           SQ FT.
                (SQ FT. OF UNITIZED CARGO AND HEAVY LIFTS FROM C+LA)                           2137.     14708.     117164.
..............................................................................................................................
                                                       VEHICLES
 II IIA
 AND IV     39  TOTAL VEHICLES                                                                  732.      4027.      29135.
..............................................................................................................................
 GRAND TOTALS -      14.567 SHORT TONS             100.665 MEASUREMENT TONS                    2869.     18734.     146299.
..............................................................................................................................
    UNIT -   H11                                           CERTIFIED - ................................
    SHIP - ST CLAIR COUNTY   LST-1096                           DATE - ...........
```

Figure 7 B

SUBROUTINE CANDLA

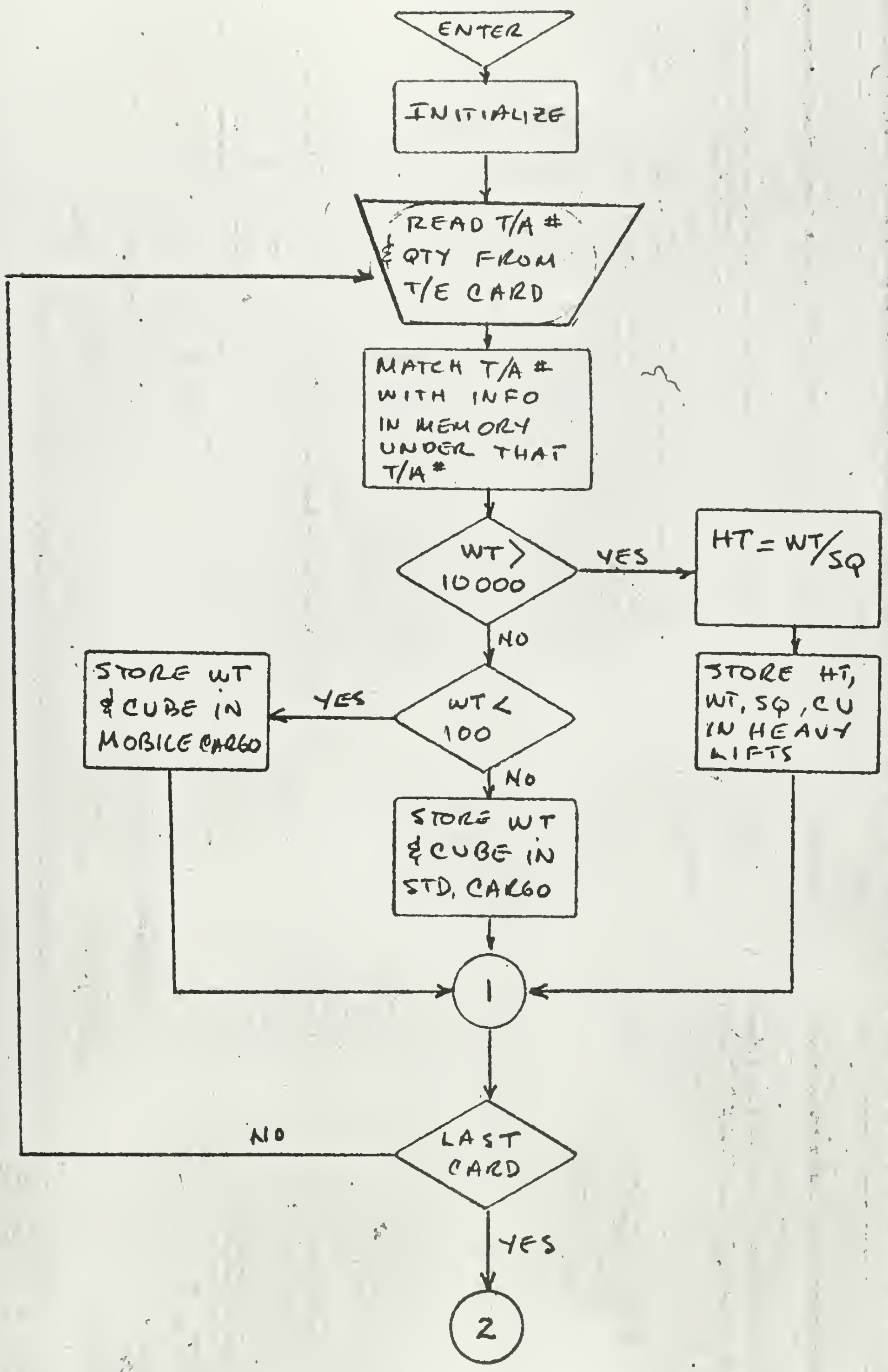

ENTER
INITIALIZE
READ T/A # & QTY FROM T/E CARD
MATCH T/A # WITH INFO IN MEMORY UNDER THAT T/A #
WT > 10000
YES
HT = WT/SQ
NO
STORE HT, WT, SQ, CU IN HEAVY LIFTS
WT < 100
YES
STORE WT & CUBE IN MOBILE CARGO
NO
STORE WT & CUBE IN STD. CARGO
1
LAST CARD
NO
YES
2

Figure 8

SUBROUTINE CANDLA

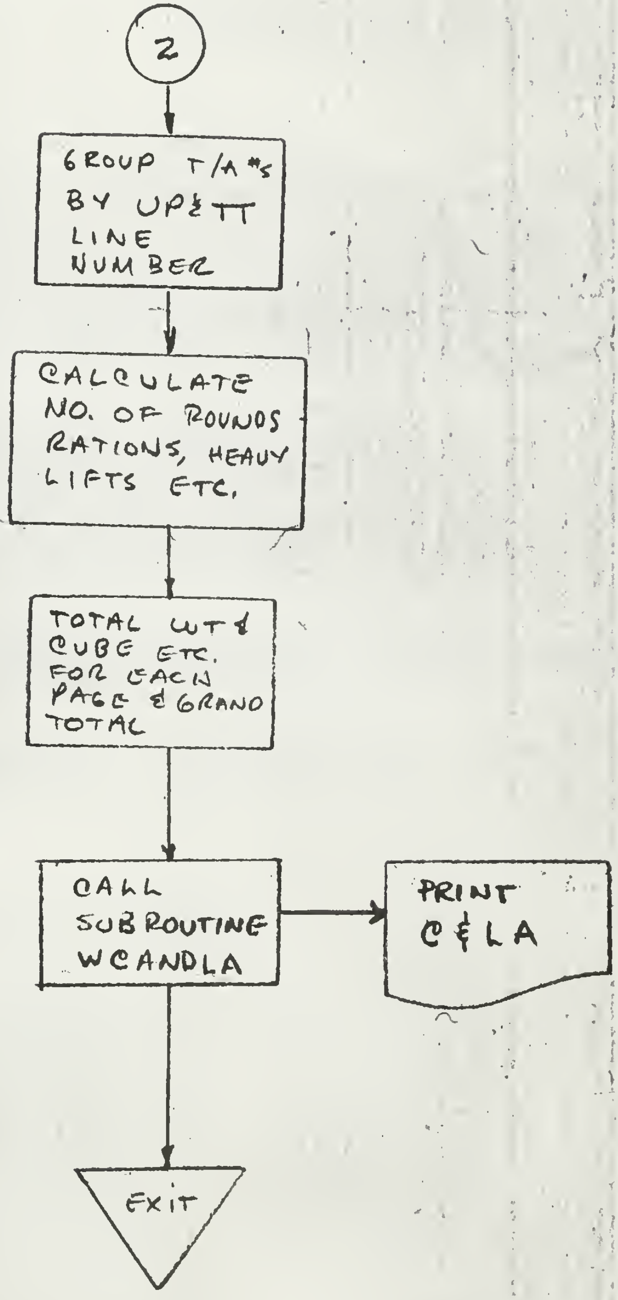

2
GROUP T/A #'s BY UP & TT LINE NUMBER
CALCULATE NO. OF ROUNDS RATIONS, HEAVY LIFTS ETC.
TOTAL WT & CUBE ETC. FOR EACH PAGE & GRAND TOTAL
CALL SUBROUTINE WCANDLA
PRINT C & LA
EXIT

Figure 8

```
      SUBROUTINE CANDLA
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),        MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                   ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7       CLASS(2),NTOV(331),NTAV(331),
     8                 XLD(100),KTA(100),
     9         SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SCUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,ORG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5            (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
      LINE = 73
      PRINT 1 CLASS,ORG,SHIP
    1 FORMAT(1X,2A8   ,//44X,33HCARGO AND LOADING ANALYSIS (C+LA),//,1X
     17HUNIT - ,A5,//1X,7HSHIP - ,(4A8))
      LINE = LINE+7
    2 PRINT 98
   98 FORMAT(52X,10HSTD. CARGO, 4X,28HUNITIZED CARGO - HEAVY LIFTS ,
     1 3X,13HMOBILE LOADED )
      DO 100 L=1,7
  100 SUM(L)=0.
C
      DO 50 II=1,M1
    9 DO 50 JJ=1,N1
      IF(NTA(II)-ITANBR(JJ))50,10,50
   10 IN=IQTY(II)
      Q=IQTY(II)
      IF(NTA(II)-10999)55,55,11
   11 IF(NTA(II)-12999)60,60,12
   12 IF(NTA(II)-13999)64,64,13
   13 IF(NTA(II)-14999)62,62,14
   14 IF(NTA(II)-15999)66,66,15
   15 IF(NTA(II)-16999)68,68,16
   16 IF(NTA(II)-29999)60,60,17
   17 IF(NTA(II)-39999)64,64,18
   18 IF(NTA(II)-40999)62,62,19
   19 IF(NTA(II)-41999)62,62,20
   20 IF(NTA(II)-42999)75,75,21
   21 IF(NTA(II)-43999)62,62,22
   22 IF(NTA(II)-49999)62,62,23
   23 IF(NTA(II)-59999)66,66,24
   24 IF(NTA(II)-69999)68,68,25
   25 IF(NTA(II)-79999)70,70,26
   26 IF(NTA(II)-82999)71,71,27
   27 IF(NTA(II)-83999)72,72,28
   28 IF(NTA(II)-84239)73,73,29
   29 IF(NTA(II)-84519)73,73,30
   30 IF(NTA(II)-84999)73,73,31
   31 IF(NTA(II)-85999)74,74,32
   32 IF(NTA(II)-86999)76,76,50
   60 IF(ORG-UNIT(KK))61,59,61
   55 L=1
      GO TO 58
   59 L=5
      GO TO 58
```

Figure 8A

```
   61 L=8
      GC TO 58
   62 IF(ORG-UNIT(KK))63,59,63
   63 L=10
      GC TO 58
   64 IF(CRG-UNIT(KK))65,59,65
   65 L=9
      GC TO 58
   66 IF(ORG-UNIT(KK))67,59,67
   67 L=11
      GC TO 58
   68 IF(ORG-UNIT(KK))69,59,69
   69 L=12
      GC TO 58
   70 FLAG2=-1.
      CALL PETROL
      LL=25
      CALL WCANDLA
      L=26
      GC TO 58
   71 L=16
      GC TO 58
   72 L=17
      GC TO 58
   73 L=18
      GC TO 58
   74 L=19
      GC TO 58
   75 L=13
      GC TO 58
   76 L=20
C
   58 LL=L
      CALL WCANDLA
   50 CCNTINUE
C
      RETURN
      END
```

Figure 8A (Cont.)

CARGO AND LOADING ANALYSIS (C & LA)

```
                                                          STANDARD            HEAVY LIFTS                         MOBILE LOADED
UP+TT  UNIT  DESCRIPTION NUMBER AND NO. ROUNDS  CUFT     WT(LB)    NO.   SQ    HT     CU      WT(LB)   CUFT    WT(LB)       WHERE
LINE                       TYPE      GALLONS                      LIFTS   FT            FT                                    STOWED
NO.                 \   CONTAINERS RATIONS,ETC.
...................................................................................................................................
   13   ATH1                1                        .0       .0     .     .0    .0      .0        .0      .0       .0
   13   ATH1                2                        .0       .0     .     .0    .0      .0        .0     2.8    122.0
   13   ATH1                2                        .0       .0     .     .0    .0      .0        .0     3.4     86.0
   13   ATH1                2                        .0       .0     .     .0    .0      .0        .0     3.4     86.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0     4.6     98.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0     1.0     40.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0 [illegible]  25.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0     1.3     25.0
    8   ATH1                1                        .0       .0     .    4.090.0     360.0        .0      .0       .0
    8   ATH1                4                        .0       .0     .     .0    .0      .0        .0    20.0    228.0
    8   ATH1                6                        .0       .0     .     .0    .0      .0        .0    36.0    600.0
    8   ATH1                6                        .0       .0     .     .0    .0      .0        .0    36.0    600.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0      .2      2.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0     2.0     25.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0     1.0     43.0
   10   ATH1                2                      15.5    252.0     .     .0    .0      .0        .0      .0       .0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0      .6      7.0
   10   ATH1               24                        .0       .0     .     .0    .0      .0        .0     1.0     72.0
   10   ATH1                4                        .0       .0     .     .0    .0      .0        .0      .0       .0
   10   ATH1                4                        .0       .0     .     .0    .0      .0        .0      .0       .0
   13   ATH1                1                        .0       .0     .     .0    .0      .0        .0     3.4     77.0
   13   ATH1                1                        .0       .0     .     .0    .0      .0        .0     3.4     77.0
   10   ATH1                2                      17.1    262.0     .     .0    .0      .0        .0      .0       .0
   10   ATH1               10                        .0       .0     .     .0    .0      .0        .0    20.0    240.0
   10   ATH1                5                      25.0    515.0     .     .0    .0      .0        .0      .0       .0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0     1.8     20.0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0     1.8     20.0
   10   ATH1                3                        .0       .0     .     .0    .0      .0        .0     9.0    100.0
   10   ATH1                3                        .0       .0     .     .0    .0      .0        .0      .0       .0
   10   ATH1                1                        .0       .0     .     .0    .0      .0        .0    11.9     73.0
   10   ATH1                2                        .0       .0     .     .0    .0      .0        .0      .0       .0
   10   ATH1                2                        .0       .0     .     .0    .0      .0        .0      .0       .0
   10   ATH1                2                        .0       .0     .     .0    .0      .0        .0     2.0     58.0
   10   ATH1                1                      14.6    362.0     .     .0    .0      .0        .0      .0       .0
   10   ATH1                3                      42.0    771.0     .     .0    .0      .0        .0      .0       .0
...................................................................................................................................
          PAGE TOTALS                             114.2  2162.0           4.0           360.0        .0   167.8   2724.0
...................................................................................................................................
          GRAND TOTALS                           1230.432145.0         1768.0          1440.0   11595.0   954.0  17317.7
...................................................................................................................................
```

Figure 8 B

SECTION V

PROGRAM MOUNTOUT

Purpose

To print out by T/A sequence number the Table of Equipment for an Infantry Regiment broken down by the amounts allowed for a Rifle Company (TE 1013), Headquarters and Service Company Infantry Battalion (TE 1037), Infantry Battalion (TE 1038), Headquarters Company Infantry Regiment (TE 1096) and Infantry Regiment (TE 1099). MOUNTOUT also indicates by duplicate T/A number following the first listing those items which are Garrison type and used in training or when permanent installations are to be set up.

Input Data

A T/A input tape with complete updated allowance information [13]. A deck of T/E cards for each company (TE 1013), The Headquarters and Service Company (TE 1037) and The Regiment (TE 1096).

Output Data Tapes

None

Restrictions

None

Methodology

MOUNTOUT processes the T/E cards for an Infantry Regiment and prints out a Table of Equipment by T/A number broken down by units making up the Regiment. The following phases are required:

1. The program identifies the incoming information as that of a Rifle Company (TE 1013), Headquarters and Service Company Infantry Battalion (TE 1037) or Headquarters and Service Company Infantry Regiment (TE 1096). After making this determination, it identifies the item as either a Garrison type item or not. The T/A numbers of Non-Garrison items are stored in a list and the quantity of that item shown on the card is stored under the unit's number; 1013, 1037 or 1096. If the item is a Garrison item the T/A number is stored in a separate Garrison List and the quantity of the item shown on the card is stored under Garrison by unit number.

2. The program computes for each T/A number, the number of allowed items for the Infantry Battalion (1038) by taking the quantity stored under the Rifle Company (1013), multiplying it by four (four Rifle Companies in a Standard Infantry Battalion) and adding to it the 1037 quantity under that particular T/A number. This is done separately for Garrison and Non-Garrison items and the results are stored separately. See Figure 9 for this relationship.

3. The program computes the Infantry Regiment allowance (1099) in the same manner by multiplying three times the (1038) quantity and adding to it the (1096) quantity.

4. The program prints out a Table of Equipment for the entire Standard Infantry Regiment. (The computational formulas must be changed for a Non-Standard Regiment.)

Figure 10 shows the flow chart for program MOUNTOUT and Figure 10A, the Fortran '60 listing.

Input

See Appendix A for card input format.

Output

The output written by MOUNTOUT is a Table of Equipment for an Infantry Regiment. A sample of which is shown in Figure 10B.

COLUMN	INDICATES
1	The item by T/A number
2	The quantity required by the Rifle Company (1013)
3	The quantity required by the Headquarters and Service Company Infantry Battalion (1037)
4	The quantity required by the Infantry Battalion (1038)
5	The quantity required by the Headquarters and Service Company Infantry Regiment (1096)
6	The quantity required for the Standard Infantry Regiment (1099)

Garrison items for the same T/A number item (if any) are listed in the same order, immediately following the first listing of the T/A number.

Timing

Running time for MOUNTOUT is approximately 2 minutes and 30 seconds.

Error Messages

If the T/E card is not 1013, 1037, or 1096, the word, ERROR is printed out in the T/A number column.

Data

MOUNTOUT data was punched in cards from Tables of Equipment for components of an Infantry Regiment.

STANDARD INFANTRY REGIMENT

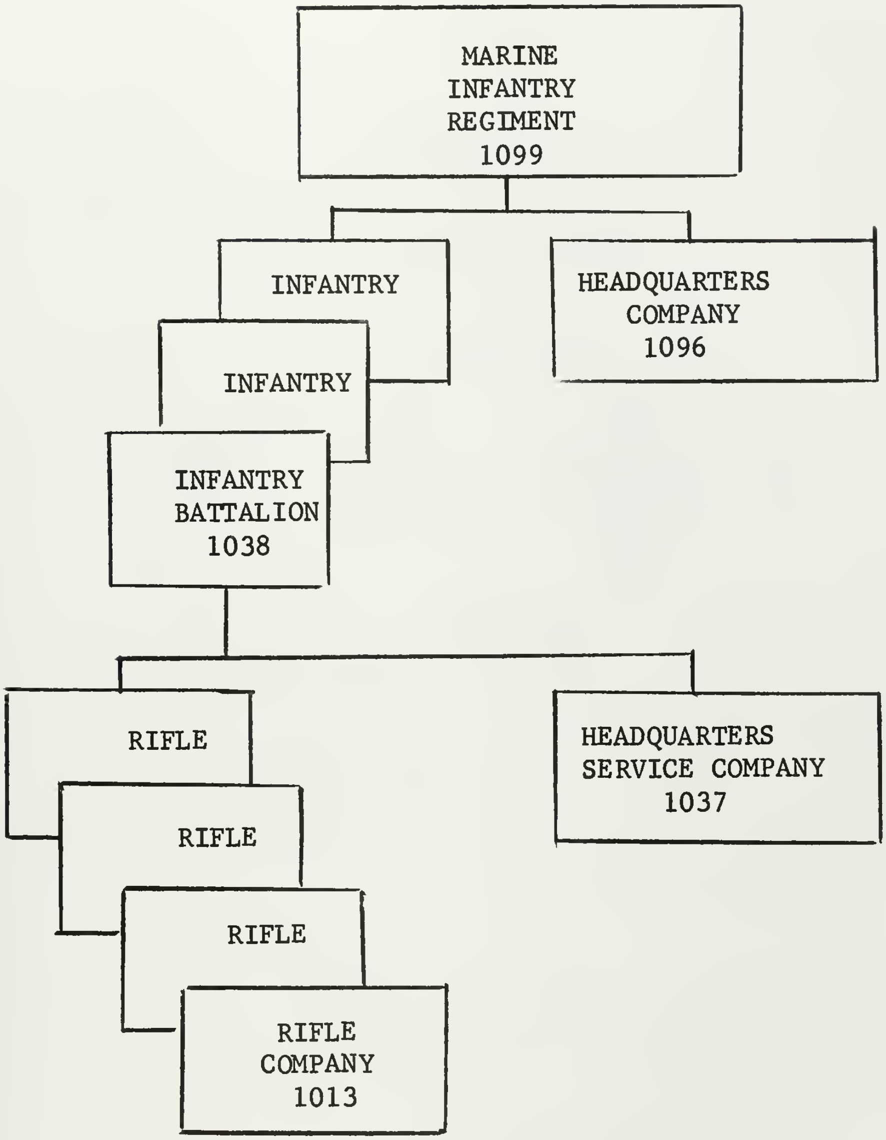

MARINE INFANTRY REGIMENT 1099
INFANTRY
INFANTRY
INFANTRY BATTALION 1038
HEADQUARTERS COMPANY 1096
RIFLE
RIFLE
RIFLE
RIFLE COMPANY 1013
HEADQUARTERS SERVICE COMPANY 1037

Figure 9

PROGRAM MOUNTOUT

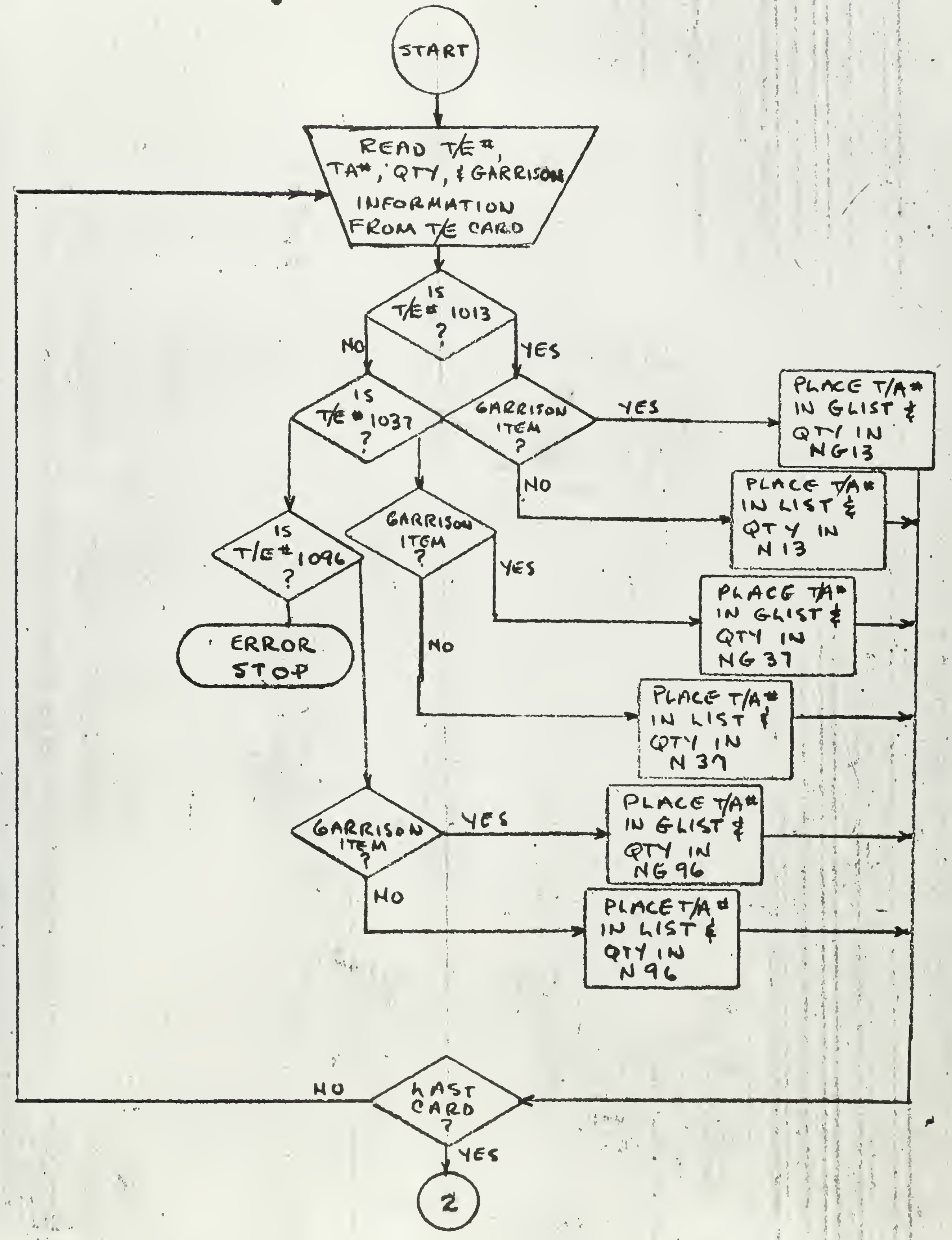

START
READ T/E#, TA#, QTY, & GARRISON INFORMATION FROM T/E CARD
IS T/E# 1013 ?
NO
YES
GARRISON ITEM ?
YES
PLACE T/A# IN GLIST & QTY IN NG13
NO
PLACE T/A# IN LIST & QTY IN N13
IS T/E# 1037 ?
GARRISON ITEM ?
YES
PLACE T/A# IN GLIST & QTY IN NG37
NO
PLACE T/A# IN LIST & QTY IN N37
IS T/E# 1096 ?
ERROR STOP
GARRISON ITEM ?
YES
PLACE T/A# IN GLIST & QTY IN NG96
NO
PLACE T/A# IN LIST & QTY IN N96
LAST CARD ?
NO
YES
2

Figure 10

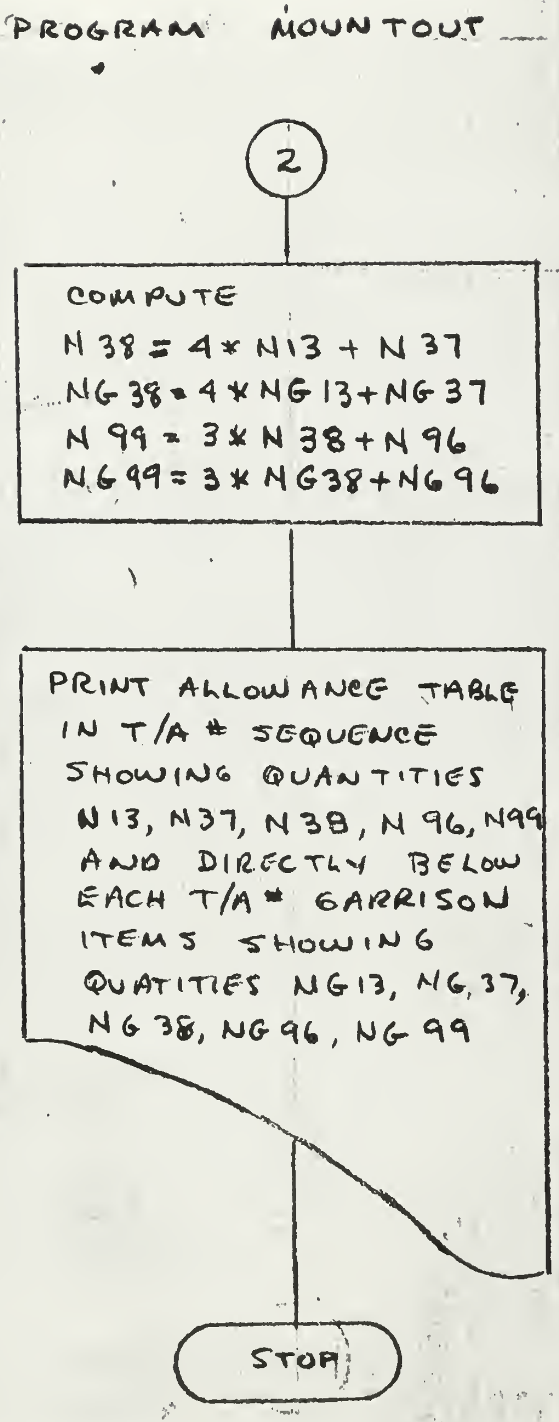

PROGRAM MOUNTOUT
2
COMPUTE
N 38 = 4 * N13 + N 37
NG 38 = 4 * NG 13 + NG 37
N 99 = 3 * N 38 + N 96
NG 99 = 3 * NG 38 + NG 96
PRINT ALLOWANCE TABLE IN T/A # SEQUENCE SHOWING QUANTITIES N13, N37, N38, N 96, N99 AND DIRECTLY BELOW EACH T/A # GARRISON ITEMS SHOWING QUATITIES NG13, NG,37, NG 38, NG 96, NG 99
STOP

Figure 10 (cont.)

```
      PROGRAM MOUNTCUT
     0DIMENSION LIST(500),NTA(500),N13( 500),N37(500),N38(500),N96(500),
     1N613(500),N637(500),N638(500),N696(500),N699(500),N99 (500),NN(500)
     2,NTE(500),NQTY(500),LISTG(500)
      DO 60 I=1,461
      NN(I)=0
      LIST(I)=0
      LISTG(I)=0
      N13(I)=0
      N37(I)=0
      N38(I)=0
      N96(I)=0
      N99(I)=0
      N613(I)=0
      N637(I)=0
      N638(I)=0
      N696(I)=0
   60 N699(I)=0
      I=0
      READ 50,(NTE(J),NTA(J),NQTY(J),NN(J),J=1,461)
   50 FORMAT(5X,I4,I5,I5,5X,I1)
  100 I=I+1
      IF(I-461)66,65,65
   66 IF(NTE(I)-1013)1,1,2
    1 IF(NN(I)-1)3,4,4
    3 LIST(I)= NTA(I)
      N13(I)=NQTY(I)
      GO TO 100
    2 IF(NTE(I)-1037)5,6,7
    5 GO TO 400
    4 LISTG(I)=NTA(I)
      N613(I)=NQTY(I)
      GO TO 100
    6 IF(NN(I)-1)8,9,9
    8 LIST(I)=NTA(I)
      N37(I)=NQTY(I)
      GO TO 100
    9 LISTG(I)=NTA(I)
      N637(I)= NQTY (I)
      GO TO 100
    7 IF(NN(I)-1)10,11,11
   10 LIST(I)=NTA(I)
      N96(I)=NQTY(I)
      GO TO 100
   11 LISTG(I)=NTA(I)
      N696(I)=NQTY(I)
      GO TO 100
   65 DO 35  I=1,461
      N38(I)=4*N13(I)+N37(I)
      N99(I)=3*N38(I)+N96(I)
      N638(I)=4*N613(I)+N637(I)
   35 N699(I)=3*N638(I)+N696(I)
      PRINT 9000
 9000 FORMAT(1H1,/////)
      PRINT 9001
 9001 FORMAT(25X21HT/E INFANTRY REGIMENT)
      PRINT 70
  700FORMAT(6X60HT/A NUMBER       1013       1037       1038       1096
     1   1099)
      DO 40  I=1,461
      PRINT 41  LIST(I),N13(I),N37(I),N38(I),N96(I),N99(I)
   41 FORMAT(6X,I5,11X,I4,5X,I4,5X,I4,5X,I4,11X,I4)
      PRINT 43,LISTG(I),N613(I),N637(I) ,N638(I),N696(I),N699(I)
   43 FORMAT(6X,I5,11X,I4,5X,I4,5X,I4,5X,I4,11X,I4)
   40 CONTINUE
  400 PRINT 401,NTA(I)
  401 FORMAT(6X,I5,5HERROR)
      END
      END
```

Figure 10A

```
                        T/E INFANTRY REGIMENT
T/A NUMBER       1013      1037      1 38      1096          1099
20050               0         2         2         0             6
    0               0         0         0         0             0
20050               0         0         0         3             3
    0               0         0         0         0             0
20090               0         5         5         0            15
    0               0         0         0         0             0
20120               0        12        12         0            36
    0               0         0         0         0             0
20120               0         0         0         4             4
    0               0         0         0         0             0
20130               0         2         2         0             6
    0               0         0         0         0             0
20130               0         0         0         3             3
    0               0         0         0         0             0
20175               0         0         0         1             1
    0               0         0         0         0             0
20330               0         1         1         0             3
    0               0         0         0         0             0
20330               0         0         0         2             2
    0               0         0         0         0             0
20335               0         0         0         2             2
    0               0         0         0         0             0
20350               0         1         1         0             3
    0               0         0         0         0             0
20350               0         0         0         1             1
    0               0         0         0         0             0
20380               0         1         1         0             3
    0               0         0         0         0             0
20380               0         0         0         1             1
    0               0         0         0         0             0
20447               0         0         0         1             1
    0               0         0         0         0             0
20450               0        12        12         0            36
    0               0         0         0         0             0
20450               0         0         0         8             8
    0               0         0         0         0             0
20490               0         0         0         9             9
    0               0         0         0         0             0
20710               0         1         1         0             3
    0               0         0         0         0             0
20710               0         0         0         1             1
    0               0         0         0         0             0
20930               0         1         1         0             3
    0               0         0         0         0             0
20930               0         0         0         3             3
    0               0         0         0         0             0
20940               0         0         0         2             2
    0               0         0         0         0             0
20970               0         2         2         0             6
    0               0         0         0         0             0
20990               0         0         0         1             1
    0               0         0         0         0             0
21010               0         0         0         1             1
    0               0         0         0         0             0
21050               0         0         0         1             1
```

Figure [illegible]0 B

SECTION VI

PROGRAM TABLE

Purpose

To print out the USMC Table of Allowances. This table specifies Marine Corps furnished items of material authorized for issue to the Fleet Marine Force and provides a listing of items for which allowances are established in individual units or activities Table of Equipment. It serves as a source of allowance information for CLASSES 1 - IV, and those CLASS II, Type 2 items which are authorized for Fleet Marine Force (FMF) and organized Marine Corps Reserve (OMCR) units on an "as required" basis.

CLASS II Type 1 supplies consist of those items appearing in the Tables of Equipment (T/E's). The allowances eatablished in the T/E's constitute the maximum amount of an item authorized to be on hand. No basis of distribution is shown for these items in the T/A. The items coded "SP" are station property items not normally authorized for the FMF or OMCR.

CLASS II Type 2 supplies consist of items authorized on an "as required" basis. These items do not lend themselves to establishment of firm allowances as requirements may vary due to assigned missions, operations, location of units and numerous other factors. Units will requisition and maintain on hand only those Type 2 items necessary to meet operational requirements.

Input Data

A deck of T/A cards for all items listed in the USMC Table of Allowances. These cards will show that T/A number, Stock Number, Identification Number, Unit of Issue, Standardization and Procurement Status, Unit Standard Package (the quantity of an item contained in a standard package), Square (square feet of rolling stock, uncrated, and assembled with normal attachments), and Cube (the cubic feet of the packed or crated standard package, except for the vehicles). For vehicles, the Cube entry indicates Cube of the vehicle, uncrated and unassembled. The card also shows Weight (gross weight in pounds of the standard package), Replacement Factors (the estimated percentage of the equipment in use that will require replacement during a given period), Fuel Type for all fuel burning equipment (gas, diesel or kerosene) and Rate of Consumption of fuel in gallons per hour. Fields are to be punched in cards as shown in Appendix A.

There is also a representative sample of description cards which are keyed to the above cards by the T/A number.

Restrictions

All numbers with the exception of T/A number, Stock Number, Identification Number and Unit Standard Package must be punched with a decimal point as indicated in the program comment statements. (See example Figure 11A.)

Methodology

"TABLE" reads the information from the incoming T/A cards; it classifies each T/A number and its associated information as to Class, Type and Technical Classification. The Technical Classifications are

Electronics, Engineer, General supply, Motor transport and Ordnance. The T/A numbers are grouped in the following serial number groups in memory:

CLASSIFICATION	CLASS II TYPE 1	CLASS II TYPE 2	CLASS IV
Electronics	20000-29999	12000	82000
Engineer	30000-39999	13000	83000
General Supply	40000-49999	14000	84000
Motor Transport	50000-59999	15000	85000
Ordnance	60000-69999	16000	86000

After the information is all read in and classified, the program prints out a complete Table of Allowance with appropriate headings and arranged by classes of supply.

Figure 11 shows the flow chart for program TABLE and Figure 11A, the Fortran '60 listing.

Input

See Appendix A for card input format.

Output

The output produced by TABLE is the Table of Allowances, a sample of which is shown by Figure 11B. A complete listing occupies 75 pages.

Timing

Running time for TABLE is approximately five minutes and eight seconds.

Data

TABLE data was punched in cards from USMC Table of Allowances [13].

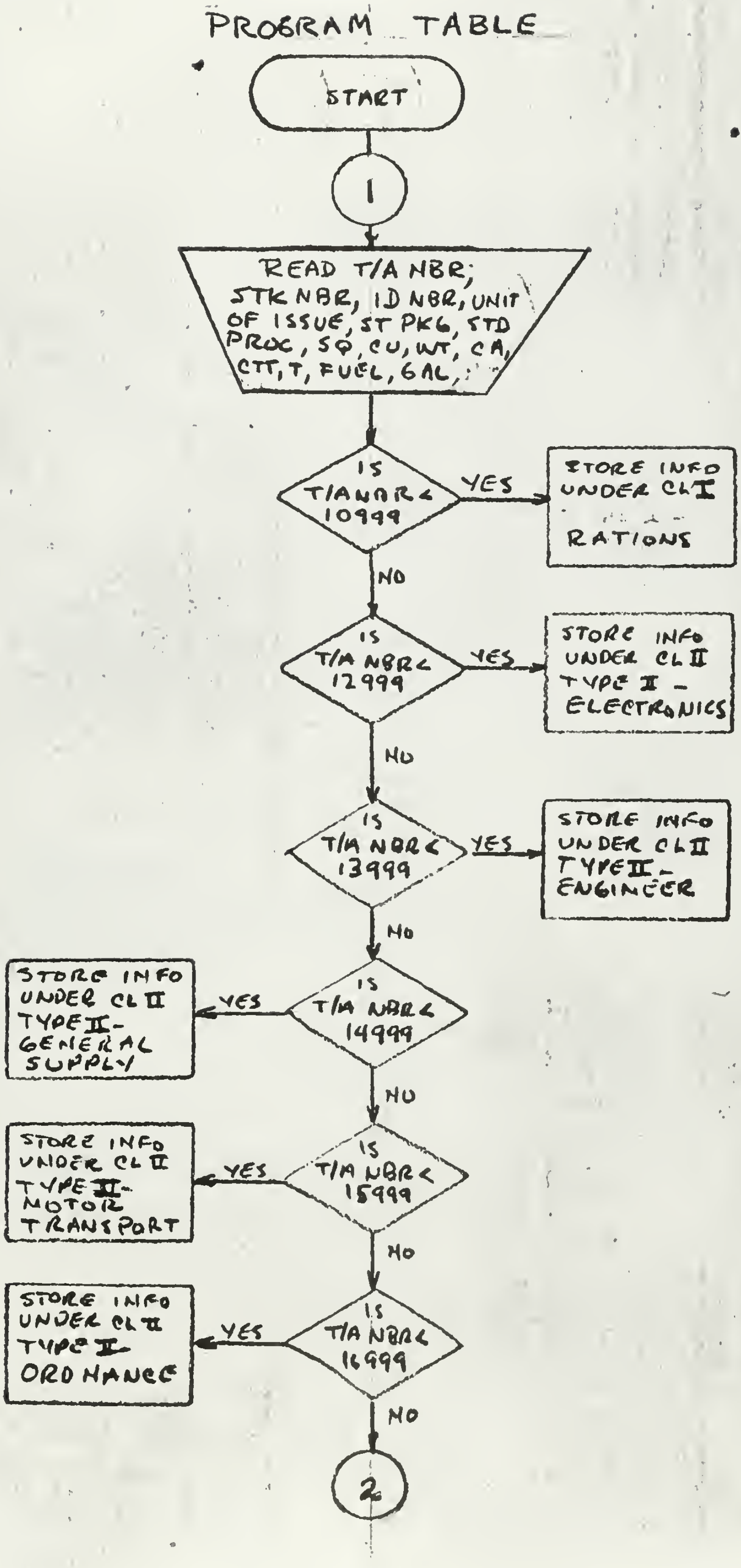

PROGRAM TABLE
START
1
READ T/A NBR, STK NBR, ID NBR, UNIT OF ISSUE, ST PKG, STD PROC, SQ, CU, WT, CA, CTT, T, FUEL, GAL,
IS T/A NBR < 10999
YES
STORE INFO UNDER CL I RATIONS
NO
IS T/A NBR < 12999
YES
STORE INFO UNDER CL II TYPE II - ELECTRONICS
NO
IS T/A NBR < 13999
YES
STORE INFO UNDER CL II TYPE II - ENGINEER
NO
IS T/A NBR < 14999
YES
STORE INFO UNDER CL II TYPE II - GENERAL SUPPLY
NO
IS T/A NBR < 15999
YES
STORE INFO UNDER CL II TYPE II - MOTOR TRANSPORT
NO
IS T/A NBR < 16999
YES
STORE INFO UNDER CL II TYPE II - ORDNANCE
NO
2

Figure 11

PROGRAM TABLE

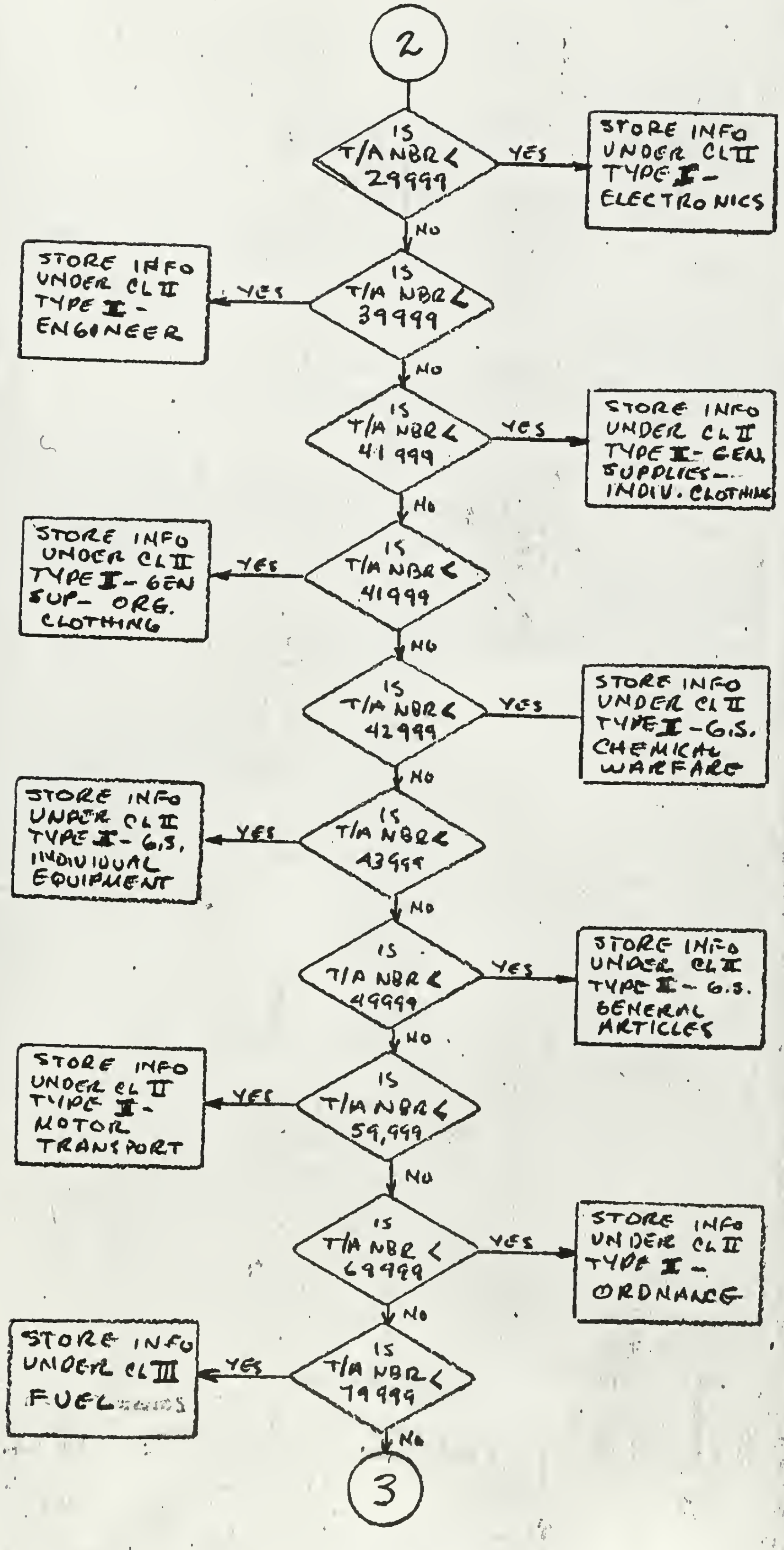

2
IS T/A NBR < 29999
YES
STORE INFO UNDER CL II TYPE II - ELECTRONICS
NO
IS T/A NBR < 39999
YES
STORE INFO UNDER CL II TYPE II - ENGINEER
NO
IS T/A NBR < 41 999
YES
STORE INFO UNDER CL II TYPE II - GEN. SUPPLIES - INDIV. CLOTHING
NO
IS T/A NBR < 41999
YES
STORE INFO UNDER CL II TYPE II - GEN SUP - ORG. CLOTHING
NO
IS T/A NBR < 42999
YES
STORE INFO UNDER CL II TYPE II - G.S. CHEMICAL WARFARE
NO
IS T/A NBR < 43999
YES
STORE INFO UNDER CL II TYPE II - G.S. INDIVIDUAL EQUIPMENT
NO
IS T/A NBR < 49999
YES
STORE INFO UNDER CL II TYPE II - G.S. GENERAL ARTICLES
NO
IS T/A NBR < 59,999
YES
STORE INFO UNDER CL II TYPE II - MOTOR TRANSPORT
NO
IS T/A NBR < 69999
YES
STORE INFO UNDER CL II TYPE II - ORDNANCE
NO
IS T/A NBR < 79999
YES
STORE INFO UNDER CL III FUEL
NO
3

Figure 11 (cont.)

PROGRAM TABLE

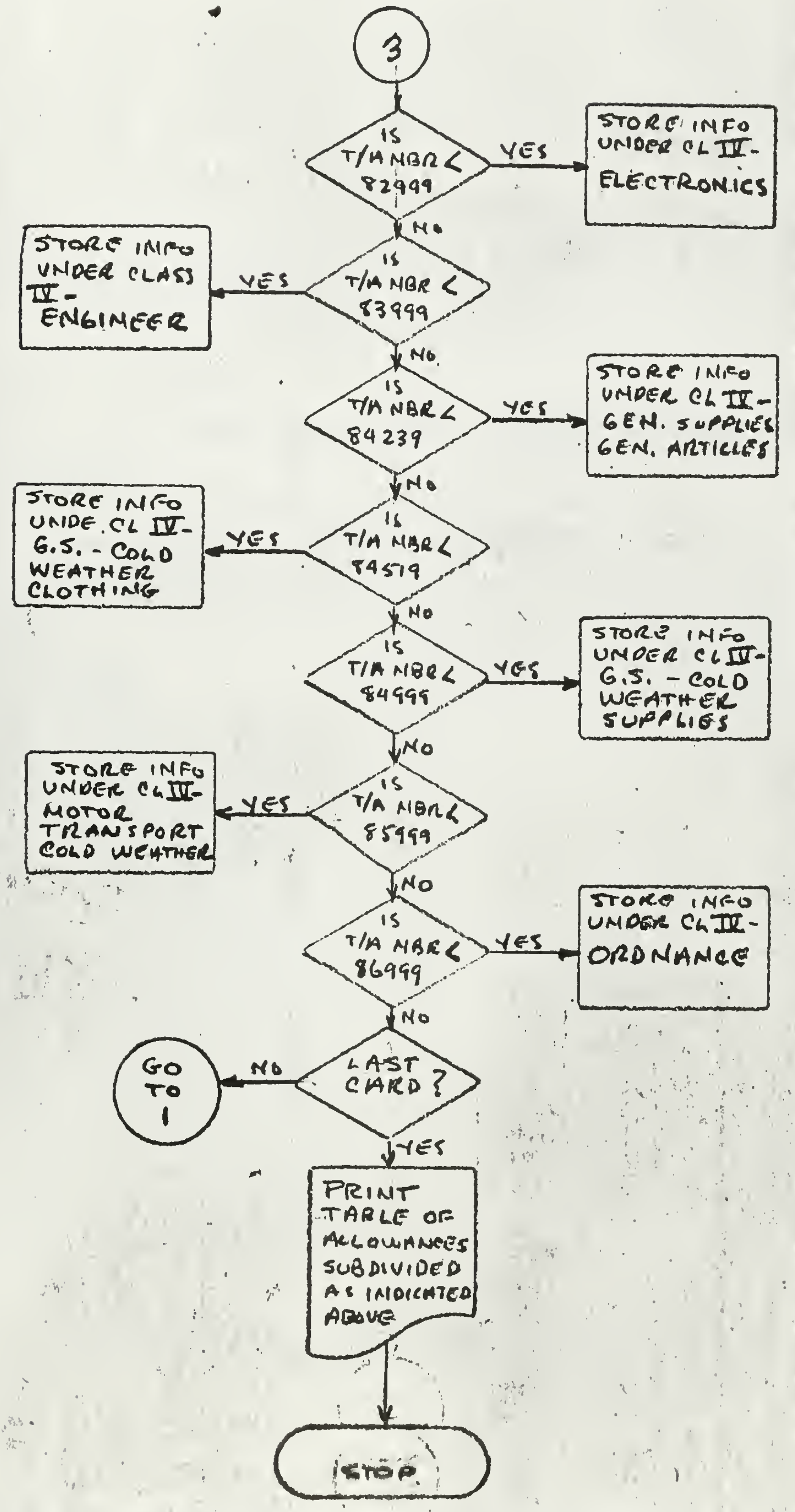

3
IS T/A NBR < 82999
YES
STORE INFO UNDER CL IV - ELECTRONICS
NO
IS T/A NBR < 83999
YES
STORE INFO UNDER CLASS IV - ENGINEER
NO
IS T/A NBR < 84239
YES
STORE INFO UNDER CL IV - GEN. SUPPLIES GEN. ARTICLES
NO
IS T/A NBR < 84519
YES
STORE INFO UNDE CL IV - G.S. - COLD WEATHER CLOTHING
NO
IS T/A NBR < 84999
YES
STORE INFO UNDER CL IV - G.S. - COLD WEATHER SUPPLIES
NO
IS T/A NBR < 85999
YES
STORE INFO UNDER CL IV - MOTOR TRANSPORT COLD WEATHER
NO
IS T/A NBR < 86999
YES
STORE INFO UNDER CL IV - ORDNANCE
NO
LAST CARD?
NO
GO TO 1
YES
PRINT TABLE OF ALLOWANCES SUBDIVIDED AS INDICATED ABOVE
STOP

Figure 11 (cont.)

```
      PROGRAM TABLE
C TO REPRODUCE THE T/A. DATA CARDS MUST BE PUNCHED AS FOLLOWS- T/A NBR
C COLS.1-5, STOCK NBR COLS.6-18 (INCLUDING DASHES), ID NBR COLS. 19-23,
C UNIT OF ISSUE COLS. 2*-25, UNIT STD PKG CCLS. 26-29, STD+PROC COLS.
C 30-33, NOTE- DO NOT INCLUDE DECIMAL POINT IN THE FOLLOWING BUT ASSUME
C IT TC BE WHERE SHOWN. SQ COLS. 35-37 (XXX.XX), CUBE COLS. 40-45 (XXXX.
CXX), WT COLS. 50-57 (XXXXXX.XX), CA COLS 60-64 (XX.XX), CTT COLS 65-69
C (XX.XX), T COLS 70-75 (XX.XX), TYPE FUEL USED COL. 76 (G,D,K), GAL PER
C HR COLS. 77-79 (XX.XX), CCLS.                        COL 80 HAS A CONTROL
C  NUMBER 1-9 FOR PROGRAM CCNTROL.
      PRINT 999
  9990FORMAT(1H1///////////////////////////47X26HUNITED STATES MARINE CORP
     1S//43X35HT A B L E  O F  A L L O W A N C E S//49X21HSHORT TITLE-T/
     2A, USMC////10X15HREVISION NO. 13 74X12HBLAND-HANSEN/10X13HNAVMC 10
     317-DP 76X12HU.S.N.P.G.S.)
      DIMENSION STKNBR(2), DESC(6), STKNBRT(2), LIST(500)
      J=0
      NPAGE=0
    1 IF(J-79) 11,665,665
  665 PRINT 666
  666 FORMAT (/  39X, 43HBLAND/HANSEN  THESIS -EMBARK- 1964 - USNPGS   )
  399 NPAGE=NPAGE+1
  400 PRINT 401,NPAGE
  401 FORMAT(1H1,110X, 5HPAGE , I3)
      J=0
   110READ 12 ITANBR,STKNBR,DNBR,UNISS,ISTPKG,STPROC,SQ,CU,WT,CA,CTT
     1,T,FUEL,GAL,NBRCRD
   120FORMAT(I5,A8,A5,A5,A2,I4,A4,1X,F3.0,2X,F6.0,4X,F8.0,2X,3F5.0,1X,
     1A1,F3.0,I1)
   10 DNBRT=DNBR
      ITTANBR=ITANBR
      STKNBRT=STKNBR
      IF(ITANBR-10999)54,54,13
   13 IF(ITANBR-12999)83,83,14
   14 IF(ITANBR-13999)84,84,15
   15 IF(ITANBR-14999) 85,85,16
   16 IF(ITANBR-15999)86,86,17
   17 IF(ITANBR-16999)87,87,18
   18 IF(ITANBR-29999)88,88,19
   19 IF(ITANBR-39999)89,89,20
   20 IF(ITANBR-40999)90,90,21
   21 IF(ITANBR-41999)91,91,22
   22 IF(ITANBR-42999)92,92,23
   23 IF(ITANBR-43999)93,93,24
   24 IF(ITANBR-49999)94,94,25
   25 IF(ITANBR-59999)95,95,26
   26 IF(ITANBR-69999)96,96,27
   27 IF(ITANBR-79999)97,97,28
   28 IF(ITANBR-82999)98,98,29
   29 IF(ITANBR-83999)99,99,30
   30 IF(ITANBR-84239)100,100,31
   31 IF(ITANBR-84519)101,101,32
   32 IF(ITANBR-84999)102,102,33
   33 IF(ITANBR-85999)103,103,34
   34 IF(ITANBR-86999)104,104,500
   54 IF(10010-ITANBR)57,55,57
   55 NPAGE=NPAGE+1
      PRINT 56 NPAGE
      J=J+1
   560FORMAT(1H1,110X,5HPAGE ,I3/42X,35HT A B L E  O F  A L L O W A N C
     1E S ,//50X,20HGENERAL SUPPLY ITEMS//51X,17HCLASS 1 - RATIONS)
      PRINT 301
      J=J+5
   57 PRINT 58 ITANBR,STKNBR
      J=J+1
   58 FORMAT(1X,I5,2X,A8,A5)
    3 N=1
      IF (N-NBRCRD) 42,42,302
  302 PRINT 303 DNBR,UNISS,ISTPKG,STPROC,SQ,CU,WT,CA,CTT,T,FUEL,GAL
  303 FORMAT(1X,A5,49X,A2,1X,I4,1X,A4,1X,F5.1,1X,F9.2,1X,F8.1,1X,
     1   3F6.2,1X,A1,1X,F5.2)
      J=J+1
```

Figure 11A

```
      GO TO 40
   42 READ 45, ITANBR, DNBR, DESC
   45 FORMAT(I5,A5,6A8)
      IF(ITANBR-ITTANBR)4,46,4
    4 PRINT 47, ITANBR,ITTANBR
      J=J+1
   47 FORMAT(X11H** ERROR ** XX 2I7)
   46 IF(DNBR-DNBRT) 5,48,5
    5 PRINT 49 DNBR, DNBRT
      J=J+1
   49 FORMAT(X11H** ERROR ** XX 2A5)
   48 IF(N-NBRCRD)38,39,900
   38 NBRCRD=NBRCRD-1
      PRINT 76,  DNBR, DESC
   76 FORMAT(1X,A5,2X,7A8)
      J=J+1
      GO TO 3
  390PRINT 77, DNBR, DESC,UNISS, ISTPKG, STPROC,SQ,CU,WT,CA,CTT,T,
     1FUEL, GAL
  770FORMAT(1X,A5,1X,6A8,    A2,1X,I4,1X,A4,1X,F5.1,1X,F9.2,1X,F8.1,1X,
     1   3F6.2,1X,A1,1X,F5.2)
      J=J+1
   40 PRINT 41
      J=J+1
   41 FORMAT(1X118H.....................................................
     1.................................................................)
      GO TO 1
   83 IF(12010-ITANBR) 57,184,57
  184 NPAGE=NPAGE+1
      PRINT 185, NPAGE
 1850FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//47X,26HELECTRONIC ITEMS - CLASS 2//57X,6HTYPE 2)
      J=5
      PRINT301
 3010FORMAT(2X,3HT/A,29X,11HDESCRIPTION,11X,24HISS  ST  STD   SQ
     1 2HCU,6X,31HWT       CA    CTT     T    F  GAL/    /
     23X,2HID,55X,8HPKG PROC,49X,2HHR//)
      J=J+4
      GO TO 57
   84 IF(13010-ITANBR) 57,186,57
  186 NPAGE=NPAGE+1
      PRINT 187, NPAGE
 1870FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//48X,24HENGINEER ITEMS - CLASS 2//57X,6HTYPE 2)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   85 IF(14005-ITANBR) 57,188,57
  188 NPAGE=NPAGE+1
      PRINT 189, NPAGE
 1890FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//47X,26HGENERAL SUPPLIES - CLASS 2//57X,6HTYPE 2)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   86 IF(15010-ITANBR)57,190,57
  190 NPAGE=NPAGE+1
      PRINT 191, NPAGE
 1910FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//44X,31HMOTOR TRANSPORT ITEMS - CLASS 2//57X,6HTYPE 2)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   87 IF(16010-ITANBR) 57,192,57
  192 NPAGE=NPAGE+1
      PRINT 193, NPAGE
 1930FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//48X,24HORDNANCE ITEMS - CLASS 2//57X,6HTYPE 2)
      J=5
```

Figure 11A (cont.)

```
      PRINT301
      J=J+4
      GO TO 57
   88 IF(20010-ITANBR)57,194,57
  194 NPAGE=NPAGE+1
      PRINT 195, NPAGE
  1950FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//47X,26HELECTRONIC ITEMS - CLASS 2//57X,6HTYPE 1)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   89 IF(30030-ITANBR)57,196,57
  196 NPAGE=NPAGE+1
      PRINT 197, NPAGE
  1970FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//48X,24HENGINEER ITEMS - CLASS 2//57X,6HTYPE 1)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   90 IF(40010-ITANBR)57,198,57
  198 NPAGE=NPAGE+1
      PRINT 199, NPAGE
  1990FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//41X,38HGENERAL SUPPLIES - INDIVIDUAL CLOTHING//52X16HCLASS 2
     2 - TYPE 1)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   91 IF(41010-ITANBR)57,200,57
  200 NPAGE=NPAGE+1
      PRINT 201, NPAGE
  2010FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//39X,42HGENERAL SUPPLIES - ORGANIZATIONAL CLOTHING//52X,16HCLA
     2SS 2 - TYPE 1)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   92 IF(42010-ITANBR)57,202,57
  202 NPAGE=NPAGE+1
      PRINT 203, NPAGE
  2030FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//42X,35HGENERAL SUPPLIES - CHEMICAL WARFARE//52X,16HCLASS 2 -
     2TYPE 1)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   93 IF(43010-ITANBR)57,204,57
  204 NPAGE=NPAGE+1
      PRINT 205, NPAGE
  2050FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//40X,39HGENERAL SUPPLIES - INDIVIDUAL EQUIPMENT// 52X,16HCLASS
     22 - TYPE 1)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   94 IF(44010-ITANBR)57,206,57
  206 NPAGE=NPAGE+1
      PRINT 207, NPAGE
  2070FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//42X,35HGENERAL SUPPLIES - GENERAL ARTICLES//52X,16HCLASS 2 -
     2 TYPE 1)
      J=5
      PRINT301
      J=J+4
      GO TO 57
   95 IF(50010-ITANBR)57,208,57
```

Figure 11A (cont.)

```
208 NPAGE=NPAGE+1
    PRINT 209, NPAGE
2090FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
   1E S//49X,21HMOTOR-TRANSPORT ITEMS//52X,16HCLASS 2 - TYPE 1)
    J=5
    PRINT301
    J=J+4
    GO TO 57
 96 IF(60010-ITANBR)57,210,57
210 NPAGE=NPAGE+1
    PRINT 211, NPAGE
2110FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
   1E S//53X,14HORDNANCE ITEMS//52X,16HCLASS 2 - TYPE 1)
    J=5
    PRINT301
    J=J+4
    GO TO 57
 97 IF(70010-ITANBR) 57,212,57
212 NPAGE=NPAGE+1
    PRINT 213, NPAGE
2130FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
   1E S//52X,15HFUEL  CLASS - 3)
    J=3
    PRINT301
    J=J+4
    GO TO 57
 98 IF(82010-ITANBR)57,214,57
214 NPAGE=NPAGE+1
    PRINT 215, NPAGE
2150FORMAT(1H1,110X,5HPAGE ,I3/42X,35HT A B L E  O F  A L L O W A N C
   1E S//47X,26HELECTRONIC ITEMS - CLASS 4)
    J=3
    PRINT301
    J=J+4
    GO TO 57
 99 IF(83010-ITANBR)57,216,57
216 NPAGE=NPAGE+1
    PRINT 217, NPAGE
2170FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
   1E S//48X,24HENGINEER ITEMS - CLASS 4)
    J=3
    PRINT301
    J=J+4
    GO TO 57
100 IF(84010-ITANBR)57,218,57
218 NPAGE=NPAGE+1
    PRINT 219, NPAGE
2190FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
   1E S//43X,33HGENERAL SUPPLY - GENERAL ARTICLES//56X,7HCLASS 4)
    J=5
    PRINT301
    J=J+4
    GO TO 57
101 IF(84240-ITANBR)57,220,57
220 NPAGE=NPAGE+1
    PRINT 221, NPAGE
2210FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
   1E S//41X,38HGENERAL SUPPLY - COLD WEATHER CLOTHING//56X,7HCLASS 4)
    J=5
    PRINT301
    J=J+4
    GO TO 57
102 IF(84520-ITANBR)57,222,57
222 NPAGE=NPAGE+1
    PRINT 223, NPAGE
2230FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
   1E S//41X,38HGENERAL SUPPLY - COLD WEATHER SUPPLIES//56X,7HCLASS 4)
    J=5
    PRINT301
    J=J+4
    GO TO 57
103 IF(85010-ITANBR)57,224,57
```

Figure 11A

```
  224 NPAGE=NPAGE+1
      PRINT 225, NPAGE
  2250FORMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//40X,39HMOTOR TRANSPCRT - COLD WEATHER SUPPLIES// 56X,7HCLASS 4
     2)
      J=5
      PRINT301
      J=J+4
      GC TO 57
  104 IF(86010-ITANBR)57,226,57
  226 NPAGE=NPAGE+1
      PRINT 227, NPAGE
  2270FCRMAT(1H1,110X,5HPAGE ,I3/43X,35HT A B L E  O F  A L L O W A N C
     1E S//48X,24HCRDNANCE ITEMS - CLASS 4)
      J=3
      PRINT301
      J=J+4
      GC TO 57
      L=0
  900 LIST(L)=ITANBR
      L=L+1
      GO TO 1
  500 PRINT 501,LIST
  501 FORMAT(1X,10I10)
C FINAL PRINTOUT IS TANBRS WITHOUT A CONTROL NUMBER IN COLUMN 80
      END
      END
```

Figure 11A

GENERAL SUPPLY ITEMS

CLASS 1 - RATIONS

T/A ID	DESCRIPTION	ISS	ST PKG	STD PROC	SQ	CU	WT	CA	CTT	T	F	GAL/HR
10010	9110-263-9865 FUEL, COMPRESSED, TRIOXANE	SP	400		.0	1.50	62.0	1.00	.00	.00	T	.00
10020	8970-577-4513 MEAL, COMBAT, INDIVIDUAL	SP	4		.0	1.10	24.0	1.00	.00	.00		.00
10030	8970-194-3986 RATION, SMALL DETACHMENT, 5-IN-1	SP	5		.0	1.10	28.5	1.00	.00	.00		.00
10040	RATION, OPERATIONAL, A	SP	1000		.0	6261.00	211800.0	30.00	.00	.00		.00
10050	RATION, OPERATIONAL, B	SP	1000		.0	3582.00	152460.0	30.00	.00	.00		.00
10060	8970-268-9934 RATION SUPPLEMENT, SUNDRIES PACK	SP	100		.0	1.90	47.0	1.00	.00	.00		.00

Figure 11 B

SECTION VII

FUTURE DEVELOPMENTS

The programs of the EMBARK system will assist greatly in that element of planning involving the preparation of the detailed embarkation and loading plans. Program TABLE will produce a current Table of Allowances as a ready reference for embarkation planners, and program MOUNTOUT may be used to produce the Table of Equipment for an Infantry Regiment, if required. The main program EMBARKD will produce the unit loading forms for distribution to Troop Commanders, and after being consolidated, these forms will be incorporated as a part of the completed loading plan.

Computers can assist in the solution of other planning problems in amphibious operations. Several studies have been made and are known to the authors. As one example, The Stanford Research Institute has developed a procedure for simulating amphibious deployment operations as a part of a study of problems involved in the world-wide deployment of the Marine Expeditionary Force in cold and limited-war situations.[12]. The simulation model developed is called MARADS, and has been designed to reduce the amount of effort required to analyze amphibious assault operations. The model will account for all the major events in the deployment process from the time a decision is made to move troops through movement to port or beach, embarkation, movement to the objective area, and projection of the forces ashore. Included in the MARADS model are programs for:

1. The efficient organization, storage and retrieval of data regarding equipment, personnel, supplies, organizations, ships and transfer vehicles.

2. The conversion of simple identifying organizations into detailed listings of personnel, equipment and supplies.

3. The allocation of personnel, equipment and supplies to subforces to transfer vehicles.

4. The simulation of the ship-to-shore operation, including the computation of the number of transfer vehicles needed by type.

5. The computation of the number of ships by type, required to transport the forces and vehicles.

6. The computation of key times throughout the entire deployment and assault operations.

The authors believe that computers can be used profitably in at least two other areas of planning. First, it is a fact that digital computers will be available on the larger ships of any amphibious task force in the future; there are presently a significant number of ships in the fleet with computer installations, and more are scheduled to be outfitted with them.

The first problem to which we shall address ourselves is the possibility of a change in the conditions at the objective area, or even a change in the objective area itself subsequent to loading, but prior to the initial landing. This would require a revision in the unloading plan, and here, the computer can make a significant contribution. With the information of the MARADS and EMBARK systems the computer could be interrogated as to the best unloading sequence available to support the new landing plan, and could test a great number of alternatives. If better alternatives were available they could be listed in order of preference, or if the change of conditions made the landing unfeasible, this also could be determined.

The next possibility for computer use would be to determine the best revised sequence for landing units and equipment if the scheme of the manuever ashore changes the initial landing. In the immediate future the means will be available for the shore party to relay by electronic signals,(e.g., microwave transmissions) new data to the computer aboard the ship in the task force. The computer will take this new data and, after processing it, come up with alternative assignments of units and equipment to meet the changing situation ashore. Of course, to be able to do this, the computer must be continually fed information as to which units have been unloaded and the status of each unloading vehicle.

It will be possible, in the near future, for the Amphibious Task Force Commander and the Landing Force Commander to have some means of visual display of information received from the computer. This will enable the commanders to request the status of the unloading at any time, and to determine when a particular piece of equipment or unit can be expected on the beach. The computer can also be programmed to forecast the time the unloading will be completed considering the progress made up to the time it was interrogated.

The ability to achieve this flexibility in the conduct of amphibious operations is of great value to the Landing Force Commander. Using computers, the alternative courses of action can be determined in a short time, to assist in making sound decisions that increase the possibilities of a successful landing.

SECTION VIII

APPENDIX A

1. INPUT PREPARATION

Figure 12 illustrates the worksheet entries for the four leading cards required as input with every T/E deck. The detailed card formats for these leading cards, the T/E cards, and the T/A cards are outlined in the remainder of Appendix A.

In the worksheet of Figure 12, card 1 contains the Organization Number, Name and Hull designation of the assigned embarkation ship, the date cards were received by the Embarkation Team Commander and the identifying letters T/E. The second card gives the classification of the documents (Top Secret, Secret, or Confidential) and the identifying letters T/E. The entries on the third card indicate the number of days of ammunition required, the number of hours of fuel required, the number of rations (meals) required, the T/A number of the rations, the number of gallons of water per man per day required and the identifying letters T/E. The fourth card contains a breakdown of the personnel in the unit. It shows the unit number, number of generals, colonels, lieutenant colonels, majors, captains, lieutenants (first and second), warrant officers, master sergeants, staff non-commissioned officers, other enlisted men and the identifying letters T/E.

A variety of card formats are used for input to the EMBARK system, they are:

Leading Cards -- (see worksheet 1, Figure 12)

Card 1

CARD COLUMNS	CONTENTS
1 - 5	Organization
6 - 10	Blank
11 - 42	Ship Description
43 - 50	Blank
51 - 58	Date of Embarkation
59 - 72	Blank
73 - 75	T/E

Card 2

CARD COLUMNS	CONTENTS
1 - 5	Blank
6 - 21	Classification
22 - 72	Blank
73 - 75	T/E

Card 3

CARD COLUMNS	CONTENTS
1 - 5	Day of Ammunition
6 - 10	Hours of Fuel
11	Quantity of Rations (number of meals)
12 - 16	T/A number of Rations
17 - 21	Quantity of Water (gallons/man/day)
22 - 72	Blank
73 - 75	T/E

Card 4

CARD COLUMNS	CONTENTS
1 - 9	Blank
10 - 14	Number of Generals
15 - 19	Number of Colonels
20 - 24	Number of Lt. Colonels
25 - 29	Number of Majors
30 - 34	Number of Captains
35 - 39	Number of Lieutenants
40 - 44	Number of Warrant Officers
45 - 49	Number of Master Sergeants
50 - 54	Number of other Staff NCO
55 - 59	Other Enlisted
60 - 72	Blank
73 - 75	T/E

T/E Cards

CARD COLUMNS	CONTENTS
1 - 5	Organization
6 - 9	T/E Number
10 - 14	T/A Number
15 - 19	Quantity Allowed
20 - 24	Blank
25	Garrison Item
30 - 37	Vehicle Registration Number

Note: 1. All numbers will be punched in fixed-point form, right justified.
2. Garrison items are indicated by a "1" punched in column 25.

T/A Cards First Card

COLUMNS	CONTENTS
1 - 5	T/A Number
6 - 18	Federal Stock Number
19 - 23	Identification Number
24 - 25	Unit of Issue
26 - 34	Standard Package
35 - 39	Square Feet
40 - 49	Cubic Feet
50 - 59	Weight
60 - 64	Combat Allowance
65 - 69	Combat Training Allowance
70 - 75	Training Allowance
76	Type of Fuel (G, D, or K)
77 - 79	Fuel Consumption Rate/Hr.
80	Control Number

Second Card (For those items showing description)

COLUMNS	CONTENTS
1 - 5	T/A Number
6 - 9	Identification Number
10 - 72	Description

Note: 1. Numbers for T/A stock number, identification number, unit of issue and standard package will be in fixed-point format, all other numbers will be floating-point format, to two decimal places.

2. Control numbers will be 1 - 9 for program control; this control number indicates the number of description cards following this T/A card.

Class V Cards

COLUMNS	CONTENTS
1 - 3	Line Number
4 - 12	DOD Ammunition Code
13 - 16	Basic Allowance
17 - 20	Combat Assault Expenditure Rate
21 - 24	Extended Operations
25 - 28	Ashore Expenditure Rate
29 - 31	Rounds, Primer, etc.
32 - 34	Fuzes
35 - 37	Extra Fuzes
38 - 41	Quantity per Package
42 - 45	Weight per Package
46 - 49	Cube per Package
50 - 52	Remarks
53 - 55	Line Reference Number
56 - 59	T/E Number
60	Blank
61 - 62	Individual Allowance
63 - 75	Blank
76 - 80	T/A Number

Note: 1. Numbers for line number, DOD ammunition code, basic allowance, quantity, remarks,line reference number, T/E number, individual allowance and T/A number will be in fixed-point format. All other numbers will be floating-point form to a maximum of two decimal places.

EMBARK WORKSHEET

COLUMNS AS INDICATED FOR EACH CARD

CARD 1	1—5	6—10	11—42	43—50	51—58	59—72	73-75
	ORG	BLANK	SHIP	BLANK	DATE	BLANK	T/E

CARD 2	1-5	6—21	22—72	73-75
	BLANK	CLASSIFICATION	BLANK	T/E

CARD 3	1—5	6—10	11	12—16	17—21	22—72	73-75
	DAYS OF AMMO	HOURS OF FUEL	RATION	T/A NUMBER OF RATIONS	WATER	BLANK	T/E

CARD 4	1-5	6-9	10-14	15-19	20-24	25-29	30—34	35-39	40-44	45-49	50-54	55-59	60-72	73-75
	BLANK	UNIT	GEN	COL	LCOL	MAJ	CAPT	LT	WO	M/SGT	S/NCO	ENL	BLANK	T/E

Figure 12

SECTION IX

APPENDIX B

1. GENERAL OPERATING INSTRUCTIONS

CONTROL CARDS

Each T/E deck must be followed by a card with "99999" punched in columns 5 through 9. After the last T/E deck and prior to the "99999" card must be a card with "98765" punched in columns 5 through 9.

TAPE ASSIGNMENTS

The following are the required tape assignments:

Tape #1 -- Fortran '60 Monitor

Tape #2 -- BCD Input ("I")

Tape #3 -- T/A Binary Data Tape

Tape #4 -- Scratch Tape ("S")

Tape #5 -- BCD Output ("O")

OPERATION OF 1604

The "three-argument monitor" control is used with the normal Fortran '60 Monitor. After loading the tapes as indicated above, type on the typewriter the following: "Monitor, 2, 5, 4." This option provides approximately 30,000 cells of memory for the program and data. Other combinations of tape assignments may be used, but the Fortran Monitor selects as scratch tape the lowest available unassigned tape unit. For this reason, it is important to remove the lockout ring from the Binary Data Tape to preclude over-writing of data.

The general form of the console statement is:

"Monitor, I, O, S." (Punctuation imperative)

Modus Operandi: (After loading tapes)

1. Push Auto-Load button
2. Type "Monitor, I, O, S."
3. Tape "I" is read and compilation performed.
4. During compilation the Fortran statements of the program are copied on Tape "O".
5. When compilation is complete, the object program is written in Binary on Tape "S". This tape then is rewound and the program is read back into memory beginning at address, 4000 (octal).
6. The program then reads in the Binary Data Tape, the 1st T/E from tape "I", and writes out the UCM, VS&PT, UP&TT and C&LA for the T/E #1.
7. If more than one T/E is used, steps 7 and 8 are repeated until T/E decks are exhausted.
8. When the "..END" card is sensed, the program stops and "..end" is typed on the typewriter.
9. Listings are printed off-line on the IBM 1403.

AVAILABILITY OF DATA TAPES AND PROGRAMS

Data tapes, system program cards and data cards are available from the United States Naval Postgraduate School Computer Facility Library.

2. MINOR SUBROUTINE LISTINGS ON FOLLOWING PAGES.

```
      SUBROUTINE WUCM
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),       MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                      ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7       CLASS(2),NTOV(331),NTAV(331),
     8                 XLD(100),KTA(100),
     9          SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,CRG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
      EQUIVALENCE (MEN(1),MC7),(MEN(2),MC6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5            (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
      L=LL
      IF(LINE-80) 9,19,19
   19 LINE=0
      PRINT 99
      PRINT 102
      LINE=LINE+4
    9 IQT=IQTY(II)
      DO 7 I=1,IQT
      SCU=0.
      SWT=0.
      SQ=0.
      HT=0.
      HCU=0.
      HWT=0.
      XMCU=0.
      XMWT=0.
      NO=NO+1
      Q=NO
      IF (FLAG4) 32,31,31
   32 XMCU=CU(0)
      XMWT=WT(0)
      GO TO 56
   31 IF(MLD(II)) 18,18,27
      IF(SQ(JJ))17,17,18
   18 IF(30000-ITANBR(JJ))11,27,17
   11 IF(39999-ITANBR(JJ))13,27,27
   13 IF(50000-ITANBR(JJ))16,27,17
   16 IF(69999-ITANBR(JJ))17,27,27
   17 IF (WT(JJ)-10000.) 2,1,1
    1 HWT=WT(JJ)
      HCU=CU(JJ)
      GO TO 56
    2 IF (SQ(JJ)) 4,4,3
    3 HT=CU(JJ)/SQ(JJ)
      SQ=SQ(JJ)
      GO TO 1
    4 IF (WT(JJ)-100.) 5,5,6
    5 XMCU=CU(JJ)
      XMWT=WT(JJ)
      GO TO 56
    6 SCU=CU(JJ)
      SWT=WT(JJ)
   56 PRINT 57 L,Q,DESC(JJ),SCU,SWT,SQ,HT,HCU,HWT,XMCU,XMWT
   57 FORMAT(2X,I3,F8.0,3X,A8,40X,F6.1,F8.1,F6.0,F5.1,F7.1,F8.0,F7.1,F8.
     10)
```

```
      SUM(1)=SUM(1)+SCU
      SUM(2)=SUM(2)+SWT
      SUM(3)=SUM(3)+SQ
      SUM(4)=SUM(4)+HCU
      SUM(5)=SUM(5)+HWT
      SUM(6)=SUM(6)+XMCU
      SUM(7)=SUM(7)+XMWT
      LINE=LINE+1
      IF(FLAG4) 60,61,61
   60 FLAG4=1.
      GO TO 27
   61 IF(LINE-80) 7,58,58
   58 PRINT 80 CLASS
   80 FORMAT(105X,2A8   ,/40X,33HBLAND/HANSEN THESIS -EMBARK- 1964    )
   99 FORMAT(1H1,1X,14HUP+TT   BOX NBR,4X,4HDESC,43X,14HSTANDARD CARGO,
     16X,14HUNITIZED CARGO,10X,6HMOBILE,/1X,6HLIN NO,87X,
     211HHEAVY LIFTS,11X,6HLOADED/66X,4HCUFT,3X,7H WT(LB) 3X,4HSQFT,3X,
     32HHT,2X,4HCUFT,3X,2HWT,5X,4HCUFT,3X,6HWT(LB))
      PRINT 102
      LINE=4
    7 CONTINUE
  102 FORMAT(120H.......................................................
     1.................................................................)
      PRINT 103 SUM
  103 FORMAT(50X14HLINE TOTALS    ,F6.1,F8.1,F6.0,F5.1,F7.1,F8.0,F7.1,F8.
     10)
      SQUPT38 = SQUPT+SUMSQ+SQUPT38
      PRINT 102
   27 RETURN
      END
```

```
       SUBROUTINE RATIONS
C
      0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
      1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
      2UNIT(420),IQTY(420),       MLD(420),LN(331),BA(331),D(331),
      3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
      4LNREF(331),                                 ITAV(50),SWTV(50),
      5SCUV(50),CUUPT(39),WTUPT(39),
      6SHIP(4),
      7       CLASS(2),NTOV(331),NTAV(331),
      8                XLD(100),KTA(100),
      9          SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
      0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
      1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
      2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
      3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
      4DATE,SHIP,ORG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
      5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
       EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
      1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
      2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
      3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
      4(MEN(12),MET),(MEN(13),MTOT),
      5          (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
      6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
       SCU=0.
       SWT=0.
       SQ=0.
       HT=0.
       HCU=0.
       HWT=0.
       XMCU=0.
       XMWT=0.
       KK=1
     1 IF(NRATS-ITANBR(KK)) 4,3,2
     2 KK=KK+1
       IF(7-KK)4,1,1
     3 X=MTOT
       JJ=KK
       Y=ISTDPKG(KK)
       Y=Y*CA(KK)
       Q=QRATS*X/Y
       CU(0)=Q*CU(KK)
       WT(0)=Q*WT(KK)
       CUUPT(1)=CU(0)
       WTUPT(1)=WT(0)
       FLAG4=-1.
C
       CALL WUCM
       CALL WATER
       CALL WUCM
     4 END
```

```
      SUBROUTINE WCANDLA
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),        MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                     ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7        CLASS(2),NTOV(331),NTAV(331),
     8                 XLD(100),KTA(100),
     9          SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,COAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,ORG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5           (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
      IF(LINE-80) 9,19,19
   19 LINE=0
      PRINT 99
      PRINT 102
      LINE=LINE+4
    9 IQT=IQTY(II)
      DO 7 I=1,IQT
      SCU=0.
      SWT=0.
      SQ=0.
      HT=0.
      HCU=0.
      HWT=0.
      XMCU=0.
      XMWT=0.
      NC=NO+1
      Q=NO
      IF(MLD(II))18,18,17
      IF(SQ(JJ))17,17,18
   18 IF(30000-ITANBR(JJ))11,27,17
   11 IF(39999-ITANBR(JJ))13,27,27
   13 IF(50000-ITANBR(JJ))16,27,17
   16 IF(69999-ITANBR(JJ))17,27,27
   17 IF (WT(JJ)-10000.) 2,1,1
    1 HWT=WT(JJ)
      HCU=CU(JJ)
      GO TO 156
    2 IF (SQ(JJ)) 4,4,3
    3 HT=CU(JJ)/SQ(JJ)
      SQ=SQ(JJ)
      GO TO 1
    4 IF (WT(JJ)-100.) 5,5,6
    5 XMCU=CU(JJ)
      XMWT=WT(JJ)
      GO TO 156
    6 SCU=CU(JJ)
      SWT=WT(JJ)
      QLIFTS = Q * WT(JJ) / 10000.
      NCONT = ISTDPKG(JJ)*IQTY(II)
  156 L=LL
      PRINT 157 L,UNIT(II),DESC(JJ),IQTY(II),SCU,SWT,QLIFTS,SQ,HT,HWT,
     1XMCU,XMWT
  157 FORMAT(1X,I5,A8,A8,5X,I5,I12,F8.1,F10.1,   2F6.0,F7.1,F8.1,F11.0)
      SUM(1)=SUM(1)+SCU
      SUM(2)=SUM(2)+SWT
```

```
      SUM(3)=SUM(3)+SQ
      SUM(4)=SUM(4)+HCU
      SUM(5)=SUM(5)+HWT
      SUM(6)=SUM(6)+XMCU
      SUM(7)=SUM(7)+XMWT
      PSCU=PSCU+SCU
      PSWT=PSWT+SWT
      PSQ=PSQ+SQ
      PHCU=PHCU+HCU
      PHWT=PHWT+HWT
      PXMCU=PXMCU+XMCU
      PXMWT=PXMWT+XMWT
      LINE=LINE+1
      IF(LINE-80) 7,58,58
   58 PRINT 102
      PRINT 203 PSCU,PSWT,PSQ,PHCU,PHWT,PXMCU,PXMWT
      PSCU=0.
      PSWT=0.
      PSQ=0.
      PHCU=0.
      PHWT=0.
      PXMCU=0.
      PXMWT=0.
      PRINT 80 CLASS
   80 FORMAT(105X,2A8  ,/40X,33HBLAND/HANSEN THESIS -EMBARK- 1964   )
     211HHEAVY LIFTS,11X,6HLOADED/66X,4HCUFT,3X,7H WT(LB) 3X,4HSQFT,3X,
     32HHT,2X,4HCUFT,3X,2HWT,5X,4HCUFT,3X,6HWT(LB))
   99 FORMAT(1X,46HUP+TT  UNIT  DESCRIPTION NUMBER AND NO. ROUNDS,  ,2X,
     1 71HCUFT      WT(LB)    NO.    SQ    HT    CU     WT(LB)   CUFT    WT(LB)
     2    WHERE  /
     3      1X, 46HLINE                                 TYPE      GALLONS     ,2X,
     4 71H                  LIFTS   FT         FT
     5   STOWED  /
     6      1X, 49HNO.                                CONTAINERS RATIONS,ETC.    )
      PRINT 102
      LINE=4
    7 CONTINUE
  102 FORMAT(120H..................................................................
     1..............................................................................)
      IF(M1-II) 202,202,27
  202 PRINT 203 PSCU,PSWT,PSQ,PHCU,PHWT,PXMCU,PXMWT
      PRINT 204 SUM
  203 FORMAT(1X,11HPAGE TOTALS,30X,F8.1,F10.1,  2F6.0,F7.1,F8.1,F11.0)
  204 FORMAT(1X,12HGRAND TOTALS,29X,F8.1,F10.1,  2F6.0,F7.1,F8.1,F11.0)
   27 RETURN
      END
```

```
      SUBROUTINE WATER
C
     ODIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),        MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                   ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7       CLASS(2),NTOV(331),NTAV(331),
     8                 XLD(100),KTA(100),
     9         SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     OCOMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,COAWT,COACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,CRG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5           (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
      SCU=0.
      SWT=0.
      SQ=0.
      HT=0.
      HCU=0.
      HWT=0.
      XMCU=0.
      XMWT=0.
      KK=1
      TOT=MTOT
      WTUPT(2)= TOT*H20/10.
      CUUPT(2)= TOT*H20/6.
    1 IF(51030-NTE(KK))17,3,2
    2 KK=KK+1
      IF(I-KK)17,1,1
    3 Q=IQTY(KK)
      X=MTOT
      G=H20*X
      G=G-(Q*400.)
   17 KKK=1
    4 IF(ITANBR(KKK)-NTE(KK))5,6,8
    5 KKK=KKK+1
      IF(N-KKK)8,4,4
    6 XMCU=400.*8.*Q
      IF(G)7,7,8
    8 KK=1
   11 IF(44250-NTE(KK))7,10,9
    9 KK=KK+1
      IF(I-KK)7,11,11
   10 KKK=1
   14 IF(ITANBR(KKK)-NTE(KK))12,13,13
   12 KKK=KKK+1
      IF(N1-KKK) 13,14,14
   13 Q=IQTY(KK)
      G=G-(Q*5.)
      G=G-(X/4.)
      IF(G)7,7,15
   15 Q=-G
      SCU=CU(KKK)*Q
      SWT=WT(KKK)*50.
    7 END
```

```
      SUBROUTINE EQUIP
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),       MLD(420),LN(331),BA(331),C(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                   ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7          CLASS(2),NTOV(331),NTAV(331),
     8                    XLD(100),KTA(100),
     9            SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,C,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,ORG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5            (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
      READ 1 ORG,SHIP,DATE
    1 FORMAT(A5,5X,4A8,8X,A8)
      READ 2 CLASS
    2 FORMAT(5X,2A8)
      READ 3 DOA,HRSFUEL,QRATS,NRATS,H2O
    3 FORMAT(F5.0,F5.0,F1.0,I5,F5.0)
      READ 444      MO7,MO6,MO5,MO4,MO3,MO1,MW,ME7,ME5,ME1
  444 FORMAT(9X,    10I5)
      MOT=MO6+MO5+MO4+MO3+MO1+MW+MO7
      MET=ME7+ME5+ME1
      MTOT=MOT+MET
      I=1
  500 READ 4 UNIT(I),NTE(I),NTA(I),IQTY(I),EG,MLD(I)
    4 FORMAT(A5,I4,I5,I5,5X,F1.0,4X,A8)
      IF(NTA(I)-98765)876,875,876
  875 FLAG=-1.
  876 IF(NTA(I)-99999)5,9,9
    5 IF(EG) 6,6,500
    6 I=I+1
      GO TO 500
    9 M1=I-1
      END
```

```
      SUBROUTINE  CLASSV
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),        MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                     ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7       CLASS(2),NTOV(331),NTAV(331),
     8                 XLD(100),KTA(100),
     9         SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,CRG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5              (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
      DO 500 K=1,50
      SWTV(K)=0.
  500 SCUV(K)=0.
      K=1
      DO 506 J=1,M1
      DO 506 I=1,331
      IF(NTAV(I)-NTA(J))506,502,506
      IF(NTOV(I)) 503,503,502
  502 IF(NTE(J)-NTOV(I)) 506,503,506
  503 IF(QTYV(I))506,506,504
      IF (LNREF(I)) 504,504,511
  511 DO 512 L=1,331
      DO 512 IT=1,331
      IF(LN(L)-LNREF(IT)) 512,513,512
  513 Q=IQTY(J)
      BACU=BA(L)*PRIM(L)*CUV(IT)*Q+BACU
      BAWT=BA(L)*PRIM(L)*WTV(IT)*Q+BAWT
      DOAWT=D(L)*PRIM(L)*WTV(IT)*DOA         +DOAWT
      DOACU=D(L)*PRIM(L)*CUV(IT)*DOA         +DOACU
  512 CONTINUE
  504 BQ=BA(I)/QTYV(I)
      FAC=1.+PRIM(I)+FUS(I)+XFUS(I)
      BAWT    =(BAWT    +BQ*Q        *WTV(I)          )*FAC
      BACU    =(BACU    +BQ*Q        *CUV(I) )*FAC
      DOAWT    =(DOAWT    +D(I)*BQ*WTV(I) )*FAC*DOA
      DOACU    =(DOACU    +D(I)*BQ*CUV(I) )*FAC*DOA
      ITAV(K)=NTA(J)
      IF (LN(I)-20) 516,516,505
  505 SWTV(K)=BAWT+DOAWT
      SCUV(K)=BACU+DOACU
      K=K+1
      GO TO 515
  516 KUP=51-5
      SWTV(KUP)=BAWT+DOAWT
      SCUV(KUP)=BACU+DOACU
  515 BACU=0.
      BAWT=0.
      DOAWT=0.
      DOACU=0.
  506 CONTINUE
C
      KV=K-1
      WTUPT(29)=0.
      CUUPT(29)=0.
```

```
      CUUPT(30)=0.
      WTUPT(30)=0.
      DO 520 K=1,KV
      CUUPT(30)=CUUPT(30)+SCUV(K)
  520 WTUPT(30)=WTUPT(30)+SWTV(K)
      K=50
  521 CUUPT(29)=CUUPT(29)+SCUV(K)
      WTUPT(29)=WTUPT(29)+SWTV(K)
      K=K-1
      IF (SWTV(K)) 522,522,521
  522 END
```

```
      SUBROUTINE PETROL
C
     0DIMENSION ITANBR(1750),ISTDPKG(1750),SQ(1750),CU(1750),WT(1750),
     1CA(1750),FUEL(1750),GAL(1750),DESC(1750),NTE(420),NTA(420),
     2UNIT(420),IQTY(420),         MLD(420),LN(331),BA(331),D(331),
     3PRIM(331),FUS(331),XFUS(331),QTYV(331),WTV(331),CUV(331),
     4LNREF(331),                                    ITAV(50),SWTV(50),
     5SCUV(50),CUUPT(39),WTUPT(39),
     6SHIP(4),
     7        CLASS(2),NTOV(331),NTAV(331),
     8                 XLD(100),KTA(100),
     9           SUM(7),MEN(13),TEMP(6),STKNBR(2),WDESC(6),FLAGS(4)
C
     0COMMON ITANBR,ISTDPKG,SQ,CU,WT,CA,FUEL,GAL,DESC,NTE,NTA,
     1UNIT,IQTY,EG,MLD,LN,BA,D,PRIM,FUS,XFUS,QTYV,WTV,CUV,
     2LNREF,BACU,BAWT,DOAWT,DOACU,ITAV,SWTV,SCUV,CUUPT,WTUPT,
     3CUUPTT,WTUPTT,STONS,XTONS,SQUPT38,SQUPT39,DOA,HRSFUEL,
     4DATE,SHIP,CRG,CLASS,NTOV,NTAV,N1,NO,M1,KV,LL,
     5LINE,NPAGE,XLD,KTA,K1,II,JJ,QRATS,NRATS,SUM,MEN,FLAGS
C
      EQUIVALENCE (MEN(1),MO7),(MEN(2),MO6),
     1(MEN(3),MO5),(MEN(4),MO4),(MEN(5),MO3),
     2(MEN(6),MO1),(MEN(7),MW),(MEN(8),ME7),
     3(MEN(9),ME5),(MEN(10),ME1),(MEN(11),MOT),
     4(MEN(12),MET),(MEN(13),MTOT),
     5          (FLAGS(1),FLAG),(FLAGS(2),FLAG2),
     6(FLAGS(3),FLAG3),(FLAGS(4),FLAG4)
C
      GAS = 0.
      DSL = 0.
      CERC = 0.
      G =6720202020202020
      D1=6420202020202020
      XK=4220202020202020
      DO 1 I=1,M1
      Q=IQTY(I)
      IF(FUEL(I)-G) 2, 4, 2
    2 IF(FUEL(I)-D1) 3,5,3
    3 IF(FUEL(I)-XK) 1, 6, 1
    4 GAS = GAL(I) * Q * HRSFUEL + GAS
      GO TO 1
    5 DSL = GAL(I) * Q * HRSFUEL + DSL
      GO TO 1
    6 CERP = GAL(I) * Q*HRSFUEL + CERP
    1 CONTINUE
      CERO = CERP+(GAS+DSL)*.005
      OAGR = 7.5*(GAS+DSL)
      DRGAS = GAS/53.
      DRDSL = DRDSL/53.
      DRCERO = CERO/53.
      DRCAGR = OAGR/53.
      WTGAS = DRGAS*376.
      WTDSL = DRDSL*430.
      WTCERO = DRCERO*400.
      WTCAGR = DROAGR*500.
      SQGAS=DRGAS*4.
      SQDSL=DRDSL*4.
      SQCERO = DRCERO*4.
      SQCAGR = DROAGR * 4.
      CUGAS = DRGAS*11.
      CUDSL = DRDSL*11.
      CUCERO = DRCERO*11.
      CUOAGR = DROAGR*11.
      SQUPT38 = (SQGAS+SQDSL+SQCERO+SQOAGR)/2.
      CUUPT(25)=CUGAS+CUCERO
      WTUPT(25)=WTGAS+WTCERO
      CUUPT(26)=CUDSL+CUOAGR
      WTUPT(26)=WTDSL+WTOAGR
      IF(FLAG2) 7,8,8
    7 CUUPT(27) = CUUPT(25) + CUUPT(26)
      WTUPT(27) = WTUPT(25) + WTUPT(26)
      GO TO 9
```

```
 8 L=27
   SQ = SQUPT38
   HCU = CUUPT(27)
   HWT = WTUPT(27)
   Q = HWT/10000.
   HCU = CUUPT(27)/Q
   HWT = 10000.*Q
   PRINT 57 L,Q,SQ,HCU,HWT
57 FORMAT(2X,I3,F8.0,65X,F6.0,5X,F7.1,F8.0)
 9 RETURN
C
   END
```

SECTION X

BIBLIOGRAPHY

1. Bill, Capt. David S., Jr., The Amphibious Assault--Fast, Flexible and Powerful, U. S. Naval Institute Proceedings, 88, Oct., 1962, pp. 46-57.

2. FMFM 11, Embarkation (1961), USMC Fleet Marine Force Manual, setting forth the principles, procedures and techniques for planning and executing the embarkation of a Marine landing force.

3. Fortran System For The Control Data 1604 Computer, Publication 087A, Control Data Corporation, 501 Park Avenue, Minneapolis, Minnesota.

4. Lewis, Jim, Amphib Forces--Antidote for Aggression, All Hands, NR 560, Sept., 1963, pp. 18-24.

5. Long, Lt. Col. Frank A., Diagnosis: The Malady of Serialization, U. S. Marine Corps Gazette, 43, June, 1959, pp. 10-17.

6. LPH--Amphibious Assault Ship, Leatherneck Powerhouse, Naval Aviation News, June, 1959, pp. 6-9.

7. New Concept in Amphibious Assault (Operation Clear Ridge), Navy, 3, March, 1960, pp. 12-13.

8. Poillon, Maj. A. J., Why We Need Serials (In Landing Operations), U. S. Marine Corps Gazette, 43, Nov., 1959, pp. 38-40.

9. Shaw, Brig. Gen. S. R., The Amphibious Assault, Ordnance, 46, July-Aug., 1961, pp. 39-41.

10. Shore, Capt. Harold E., Let's Streamline Our Helicopter Assault Planning, U. S. Marine Corps Gazette, 46, April, 1962, pp. 28-31.

11. Silverman, CDR. Milton J., New Concept in Cargo Handling Speeds Amphibious Assault, National Defense Transportation Journal, 17, Sept-Oct., 1961, pp. 46-48.

12. Stanford Research Institute, An Amphibious Deployment Simulation Model: The MARADS System, July, 1963, SRI Project No. 2167-32.

13. United States Marine Corps Table of Allowances, Short Title: T/A, USMC, Revision No. 13, NAVMC 1017-DP.

14. USMC Order 8010.1A of 27 June 1960 and Change 1 of 10 April 1962, Class V Logistical Procedures.

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